

CEYLON

A

GENERAL DESCRIPTION OF THE ISLAND,
HISTORICAL, PHYSICAL, STATISTICAL.

CONTAINING THE MOST RECENT INFORMATION.

BY

AN OFFICER, LATE OF THE CEYLON RIFLES.

IN TWO VOLUMES.

VOL. II.

WITH A MAP.

LONDON:
CHAPMAN & HALL, 193, PICCADILLY.
1876.

[*All Rights Reserved.*]

LONDON :
BRADBURY, AGNEW, & CO., PRINTERS, WHITEFRIARS.

CONTENTS.

CHAPTER XX.

COLOMBO TO NEWERA ELLIA.

	PAGE
Public conveyances—Mode of travelling in the island—Rest-houses—The Kadugannaya pass—Obelisk to Captain Dawson—Beauty of the road to Pusilawa—Moonlight scene—Rambodde water-fall—The valley of Newera Ellia—English aspect of the houses—The climate of the valley—Pedru-talla-galla—Commanding view from the summit—Kandy and its picturesque position	1

CHAPTER XXI.

ADAM'S PEAK.

Fancy of mankind for climbing high mountains—When connected with Adam—Worship of the sun—Buddha, legend of his foot-print—Kwan-yin—Did the Ark rest on Adam's Peak—Dr. Kitto's Cyclopædia—Let of the Gnostics—M. Dulaurier's version—Various foot-prints in the world—Ascent of the Peak—Thick jungles—Pinnacle of the Peak—The chains—According to Mahometan legends made by Alexander—Ibn Batuta—View from the summit unsurpassed—Fogs—The descent	9
--	---

CHAPTER XXII.

LITERATURE AND ARTS.

Books and writing—The Buddhist Atthakatha—When compiled—The convocation of Asoka—Language—Weaving—Fine arts—Music—Working in metals—Iron and steel—Coins and currency—Various arts—Distillation—Lightning conductors—Medicine—Architecture—Dagobas—Monasteries	24
--	----

CHAPTER XXIII.

BUDDHISM.

Character of Sakya—Resemblance between Buddhism and Christianity—Its failure to improve the condition of mankind—Its Heaven a hideous phantom—Biography of Sakya—The “Lalita Vistara”—The four truths—The wheel of the law—Buddhism and the inscriptions of Asoka—Nirvana—Its Atheistical tendency—Buddhist schisms—Kwan-yin—Buddha's relics—The “Dalada”—The “Patra”—Marco Polo's account of them—De Couto's version—Temples—Buddhist priests—Buddhist nuns—The Chinese Queen of Heaven—Demonology and snake worship—Brahminism—Christianity in Ceylon 55

CHAPTER XXIV.

MAMMALIA.

Introductory remarks—Monkeys—The Sloth—Bats—Flying-foxes—Shrews—Bears—Jackals—Dogs—Palm-cats—Mongoes—Leopards—Tiger-cats—Squirrels—Rats—Hares—Porcupines—Horses—Ant-eaters—Wild pigs—Elephants—Deer—Buffaloes—Oxen—The Dugong, or mermaid—Dolphins—Whales—Porpoises—List of Mammalia 97

CHAPTER XXV.

BIRDS.

Eagles—Kites—Hawks—Owls—Goat-suckers—Swallows—Kingfishers—Bee eaters—Hoopoes—Sun-birds—Warblers—Orioles—Babblers—Bulbuls—Fly-catchers—Shrikes—Crows, Jays, and Starlings—Hornbills—Parroquets—Barbets and Woodpeckers—Cuckoos—Pigeons and Doves—Peacocks—Jungle-fowl—Partridge and Quail—Grallæ—Herons—Bitterns—Storks—Ibises—Snipe—Rail—Water-hens—Flamingoes—Gulls—Pelicans—List of Birds 139

CHAPTER XXVI.

REPTILES.

Crocodiles—Monitors—Scincs—Geckoes—Lizards—Chameleon—Snakes—Snake-bites and antidotes—Dr. Fayrer's experiments—Snake-eating snakes—Rat-snakes—The Python—Shield-snakes—Blind snakes—Sea-snakes—Freshwater snakes—Tree-snakes—Frogs—Turtles and Tortoises—List of Reptiles 178

CHAPTER XXVII.

INSECTS.

Vast numbers of insects in tropical climates—Beetles—Butterflies—Moths—Leaf-insects—Cockroaches—Dragon-flies—Termites—Ants—Wasps and Bees—Crickets—Mosquitoes—Flying-bugs—The Coffee-bug—Ticks—Mites—Scorpions—Spiders—Centipedes—Millepedes—Woodlice—Leeches—Worms—List of Insects 208

CHAPTER XXVIII.

FISH.

Mullet—Chæstodon—Triglidae—Seer-fish—Boneto—Kummelmus, or dried fish—The Goat-fish—Sucking-fish—Sailor-fish—Walking-fish—Sea surgeons—Lip-fish—Half-beaks—Flying-fish—Sprats and Sardines—Eels—Pipe-fish—Coffin-fish and Trigger-fish—Urchin-fish, or Balloon-fish—Sharks and the Pilot-fish—Saw-fish—Rays—Poisonous-fish—Freshwater-fish—Travelling-fish—Burying-fish—The Anabis—Various freshwater species—Showers of fish—List of Fish	242
---	-----

CHAPTER XXIX.

CRUSTACEA AND MOLLUSCA.

Painted crabs—Swimming crabs—Beckoning crabs—Hermit crabs—Pea crabs—Sand crabs—Spiny lobsters—Flat lobsters—Prawns—Marine shells—Land shells—Chanks—Oysters—Star-fish—Flat worms—Sea-slugs—Jelly-fish—Zoophytes—List of Crustacea and Shells	269
--	-----

CHAPTER XXX.

PEARLS AND THE PEARL FISHERY.

Their antiquity as an ornament—Cleopatra's ear-rings—Drinking of dissolved pearls—Largest pearls come from the West Indies—Origin of the term Margarita—Revenue derived from the fishery—Natural history of the pearl-fish—Migrations of the pearl-fish—Artificial pearls—Description of the fishery—Shark-charmers—Manner of diving—Drilling and polishing pearls	277
--	-----

CHAPTER XXXI.

COFFEE.

First used as an alimentary infusion in Abyssinia—Coffee drinking prohibited in England by Charles II.—When introduced into Europe—The Dutch first to plant it in Ceylon—Coffee mania of Ceylon—Ruin of the first speculators—Malabar coolies—Manner of preparing the berry	301
---	-----

CHAPTER XXXII.

THE PALMS.

Areca—Betans—The Talipot—The Palmyra—The Kittool—The Cocoa-nut—Its varied uses—Cocoa-nut oil—Coir—Toddy—Jaggery—Cocoa-nut planting	312
--	-----

CHAPTER XXXIII.

CINNAMON.

Ceylon cinnamon unknown to the ancients—First mentioned by Kaswinj A.D. 1275—Doubtful if indigenous in the island—Not planted by the Dutch—The cinnamon monopoly—When abandoned—Mode of preparing the spice—Oil of cinnamon . . . , 360

CHAPTER XXXIV.

BOTANY.

General description of the flora of the island—Exotics—List of vegetable products exported—Timber trees—Fruits—Water plants—Orchids—Fungi and Lichens—Plants of the North—Plants of the shores—Plants of the highest hills 346

CHAPTER XXXV.

BOTANY—*continued*.

General description of plants belonging mostly to the lower regions, comprising the principal part of the flora of the island . . . 381

APPENDIX.

THE MALDIVES.

CEYLON,

ANCIENT AND MODERN.

CHAPTER XX.

COLOMBO TO NEWERA-ELLIA.

SINCE the opening of the railway between Colombo and Kandy, in 1867, the traveller can take his ticket and be whirled in a few hours to his destination, but on all the other roads the old mode of travelling must still be followed.

Formerly the only public conveyance in the island was a very primitive one, that travelled between Kandy and Colombo, and Galle and Colombo, three or four times a week, carrying a few passengers, principally rich half-castes, performing the journey in about twelve hours.

Most Europeans prefer travelling in their own carriage or on horseback, in easy stages of from fifteen to twenty miles, during the night or early in the morning, to avoid the heat of the sun, spending the day in buildings called "rest-houses," erected by government at intervals along the roads. These buildings are similar to Indian choultries.¹ Shelter is all that is to be obtained in many of them; some have bedsteads, a few chairs and tables, with a native employé in charge of each, but on unfrequented routes they are often in a dirty and

¹ This species of accommodation for travellers has existed in many parts of the East from time immemorial, and seems to be alluded to by Jeremiah, ch. ix. 2, "Oh that I had in the wilderness a lodging-place of wayfaring men," &c. Gabriel Durand, a missionary in Thibet in 1861, describes a kind of rest-house in that country called Kung-Ruan, Ann. Prop. de la Foi, xxxv. 352.

neglected state. Bennett mentions finding two panthers located in one at Wallewe, near Tangalle, in 1826; and the rest-house at Kaigalle was uninhabitable from leeches after heavy rains, the neighbourhood being infested with these pests.

A precarious supply of fowls' eggs and rice being all the provisions that can be obtained on the road in several parts of the country, travellers are obliged to take many things with them, also servants and coolies.¹

This manner of travelling is exhilarating and amusing in the highest degree. The refreshing coolness and enchanting beauty of the nights, the novelty and variety of the scenes through which you pass, all conspire to make it so. The deep gloom and stillness of the forests which overhang the road on either side are followed by the beauties of a tropical sunrise. The voices of birds, the harbingers of the morn, breaking the solemn silence of the night, echo on all sides their various cries. The first glimmering of dawn quickly expands into the glowing day as the rosy sun appears above the horizon, and rolling back the mists of the valleys unveils some new scene of beauty. All is then smiling around you, the morning is in its first freshness, the lotus has risen with the sun from beneath the water of the pool, and is giving out its delicious odour. The jungle cock, with shrill note, shouts his réveillé in the distance; flights of parroquets rush through the air with loud screams, and the busy hum of insects resounds on all sides.

At no part of the day does the tropical landscape present such charms as immediately after sunrise. How bright and vivid the verdure of the jungle, in tears from the moisture of night! The flowers also seem freshly awakened and perfumed, every plant sending its fragrance through the air; but all is soon a blaze of light as the sun's fervid rays dry up the dew-drops that sparkle like gems on the leaves, and a fierce

¹ Great retinues of servants and coolies attend travellers in the East; in the year 1800, the governor, on a tour round the island, was accompanied by 160 bearers, 400 coolies, two elephants, six horses, and fifty Lascars.

glare replacing the brilliant freshness of the early morning, you are glad to arrive at your journey's end to escape it.

The day is spent in repose at the rest-house, all animated nature around you hushed into silence by the oppression of the fervid noon. Midday in the jungle is almost as silent as the night, the vivacity of the morning gradually dying away as the sun reaches the meridian.

The road from Colombo to Kandy is very flat until you reach Ambepusse, about thirty-five miles, where the rest-house is situated in the gorge of a ravine surrounded by hills, the commencement of the high lands of the interior. At the top of the Kadugannava pass, about 2,000 feet above the sea, the road reaches its highest point, being carried over a mountain, and the views from this place are magnificent. Here there is a stone obelisk, erected by public subscription, to the memory of Captain Dawson, R.E., who planned and executed the road; he died at Colombo, March 28, 1829.

Near to Peradenia the road to Gampola and Newera-Ellia branches off and runs close to the river Mahavilla-ganga for several miles. The rest-house at Gampola is very prettily situated close to the river, crossed by a suspension bridge, erected during the governorship of Sir H. Ward.

The road from Gampola to Pusilawa is singularly beautiful, winding zig-zag along the sides of steep hills, with torrents foaming below. Some years since the acclivities were clothed with dense forests of fine trees and gigantic ferns, among which was a curious species of gamboge-tree (*Xanthochymus ovalifolius*, Roxb.), its branches and trunks covered with yellow gum, and the tall Kattoo-imbool of the Singhalese (*Salmalia Malabarica*), laden with scarlet tulip-shaped blossoms; but these stately forests have in great measure given place to coffee plantations, which now cover this district. The vale of Kotmalee, through which the road passes before ascending the mountains leading to Newera-Ellia, presents very grand and beautiful prospects; the valley is overhung on the south-east side by a range of mountains, rising several thousand feet above the sea, while the Mahavilla-ganga, fed by numerous torrents coursing down the

ravines, winds its way through it. Beautiful as this valley is by day it is perfectly enchanting at night, when lit up by a brilliant moon, bright enough to read by—such a moon as is only to be seen in the tropics, with a sort of golden hue in it, mingling the warm radiance of day with the paler lustre of night. All nature lies in a profound silence, only disturbed by the hum of innumerable insects arising on all sides, while a most delicious softness pervades the air, which is laden with the odour of lemon-grass.

The valley of Kotmalee ends in a kind of *cul-de-sac* at Rambodde rest-house, which is finely situated between two waterfalls formed by the Puna-Ellia and Garunda-Ellia, tributaries of the Mahavilla-ganga. The mountains rise abruptly across the valley at this place, one river falling over near the centre into the vale below with a great noise, rendering it difficult to sleep. From this to Newera-Ellia is about fifteen miles of an exceedingly steep road, being carried the whole way through a succession of mountain defiles, thickly wooded and furrowed by innumerable torrents. At Rambodde the road turns abruptly to the right, crossing the river close to the fall, and winds at an incline of one in fourteen up the face of the mountain, fine views of the valley below being obtained at intervals. Many coffee plantations have been made here, which are said to produce the best berries in the island.

On reaching the top of the pass an opening in the defiles reveals Newera-Ellia to your view, as it lies below embedded among the wooded mountains, a verdant plain of grass interspersed with rhododendrons covered with crimson blossoms, a considerable stream, one of the sources of the Mahavilla-ganga winding in a serpentine course through the valley.

This sanatorium, distant 112 miles from Colombo, is an undulating plain, 6,240 feet above the sea, running from north-east to south-west, divided into two unequal portions by a ridge of low wooded hills, the larger being nearly two and a half miles in length by three-quarters broad, or about seven miles in circumference, the smaller portion forming an extensive ravine, and nearly surrounded by high mountains, covered with trees from summit to base, which throw their

huge shadows over the plain a great part of the day. The only buildings about thirty years ago were two rows of native huts, forming the bazaar at the entrance of the valley; the barracks in the smaller valley, a rest-house, a "cutchery" and court-house, a commissariat store, and a few scattered houses for the official residents and visitors in search of health.

The houses, consisting of only the ground-floor, were all made of wooden frames filled in with mud, plastered and whitewashed, and thatched with long grass, the walls covered with roses and creeping plants, and surrounded with gardens filled with English flowers and fruits. These, with the carpeted rooms and fire-places, delighting and astonishing the new arrival with a pleasing picture of home in the midst of a tropical jungle.

The change is indeed surprising from the oppressive heat of Colombo, with its accompanying languid and flabby limbs, where a single sheet at night seems too much, to blankets and a fire; to awaken after a refreshing sleep, rarely obtained in Colombo, and see the grass white with hoar-frost, and hear the voice of the robin and blackbird near one's window. If an early riser, the new arrival takes a stroll before breakfast, feels the crisp grass and leaves crackling under his feet, expands his chest and inhales the pure air with a degree of delight only understood by those who have felt the magical change, returning to breakfast with a sharp appetite and a vigour of limb almost forgotten. Clothing which makes one hot to look at in Colombo is here donned with pleasure, and we are glad to sit near a fire at breakfast and in the evenings. Since the increased facilities of travelling, the valley is annually visited by numbers of Europeans from the coasts during the hot season there, and can now boast of a church, a reading-room, and an hotel, and numerous residences have been erected.

In consequence of its elevated position the air is very rarefied, causing a slight difficulty in breathing upon any exertion. The clouds, attracted by the mountains, often descend into the valley, completely obscuring everything with a thick mist, and there is a great deal of rain, especially at the change of the monsoons. The south-west blows with

great violence, accompanied by tremendous peals of thunder and vivid flashes of lightning, to which the thin air and elevated position gives an astounding effect, and which seem sufficient to shake the mountains to their foundations.

The thermometer ranges from 58° at six A.M. to 70° and 75° during the day, descending to 60° at six P.M., and the nights are very cold, the grass being covered with hoar-frost in the mornings from December to March, and water previously boiled will freeze if left out of doors. Sudden variations of temperature sometimes occur, an oppressive heat at noon being succeeded by great chill in the evenings.

Experience has shown that the climate of Newera-Ellia is not so favourable for the cure of tropical diseases as at first imagined. Persons whose liver is in a bad state, or in advanced stages of dysentery, are rather injured than otherwise by the sudden change of temperature, the cold air of the mornings causing congestion. It is more valuable as a preventive of disease than as a cure for it. Persons resident on the coast will find themselves benefited by a periodical visit to Newera-Ellia, as it braces up the system and gives renewed strength to stand the enervating influence of the heat of the lower districts. The climate of Newera-Ellia and the hill sanatoriums of India is very similar, and there is little difference in their effects.

Since the extensive clearance of the forests in the vicinity for coffee plantations the climate appears to have undergone a change, and will doubtless change still more. There is much less rain than formerly, and the temperature is higher; mosquitoes and sparrows are common there now, although quite unknown to older inhabitants.

All the English flowers and vegetables grow to perfection, particularly potatoes and cabbages. Peaches will not ripen, and cherries hardly bloom. These trees, stimulated by the perpetual spring, become evergreens; but strawberries are very fine, also citrons and Cape gooseberries (*Physalis Peruviana*). Wild raspberries (*Rubus rugosus*) grow in the greatest profusion, and geraniums are so large they make hedges. Of late years many European plants and fruits have been introduced

which were unknown formerly, and attempts have been made to cultivate wheat and other cereals, but the latter have not been very successful. (*Vide* ch. v.) Potatoes are largely cultivated, and at considerable profit, for the Colombo market; but since the introduction of the potato disease this crop has become precarious. Sir S. Baker, who spent some years at Newera-Ellia, has written a pamphlet on the advantages of European colonization of the mountains of Ceylon. The neighbourhood of Badulla would be the best suited for this purpose, as it is more fertile than anywhere about Newera-Ellia, and produces many varieties of useful crops; but it should be borne in mind that the European constitution generally becomes too much enervated in a tropical climate to be capable of any amount of exertion.

The first Englishman who visited Newera-Ellia was Dr. Davy, in 1819, and subsequently a party of officers on an elephant-shooting excursion, about the year 1826. On their return to Colombo, General Barnes, the governor, was so much taken by their account of the climate that he decided to form a sanatorium there, and opened a road to it from Kandy in 1829. Sir E. Tennent appears to have overlooked Dr. Davy's statement that he visited the valley in 1819, when he wrote, "The first visit of Europeans to this lofty plateau was made by some officers, who, in 1826, penetrated so far in pursuit of elephants" (ii. 206).

The soil in many places is black and swampy, and gems are found at the end of the valley near the road to Badulla, and searching for them is an occasional amusement with visitors, but none of any value are ever found. There is a great deal of Nillo underwood in the jungles, a species of *Strobilanthes* and a septennial. The seeds are eagerly sought after by rats and jungle fowl, who migrate to the neighbourhood to eat them, the latter affording capital sport while it lasts.

The dome-shaped mountain that rises above the valley on the north-eastern side, and towers over all the others, is called Pedru-talla-galla, and is the highest in Ceylon, being 2,040 feet higher than the valley. A very steep and winding foot-path, made by General Barnes, leads to the summit, which is not

many yards across. The view from it is very extensive. Before the axe of the planter had intruded on the jungle it presented a vast sea of foliage reaching to the horizon, broken here and there by a patch of grass. As the eye ranged over the whole of this immense space, not the slightest trace or sign of man or living thing could be seen, not even a wreath of smoke to indicate the existence of some hidden hut or village. The air on the summit is rather cold and damp, and the voice echoes with surprising clearness and loudness in the rarefied air. As you reach the top of the mountain the trees become quite dwarfed, not being higher than shrubs, with gnarled and knotted trunks covered with moss and lichens.

Kandy.—This town is very picturesquely situated on the margin of a small artificial lake, and surrounded on all sides by thickly-wooded hills, which approach much nearer the lake on one side than the other; a road, fringed with trees, running all round it close to the water's edge, forms the usual evening drive of the inhabitants. There is also an esplanade between the lake and the town. In the lake is a miniature island, where the kings of Kandy formerly kept their wives. The English turned it into a powder magazine.

- The beauty of its position is the most that can be said in favour of Kandy, being in every way inferior to Colombo, and not healthy; it is also horribly infested with snakes and reptiles. When the English arrived it was a miserable hole, fearfully dirty, and composed of mud cabins, as the kings reserved the luxuries of windows and tiles for themselves, their subjects being only allowed to live in huts. The palace was a mean building, some parts of which still remain, and have been converted into a court-house. There were a great number of temples, the majority of which have fallen to ruins. The town, however, is much improved since then, and now contains many good and substantial houses. Some of the suburbs are densely populated, the road to Peradenia being studded for miles with huts, bazaars, and gardens.

CHAPTER XXI.

ADAM'S PEAK.

MANKIND in all ages seem to have had a fancy for climbing high mountains; and the mysterious sanctity attached to high places, and a belief in spirits resting in the air, between heaven and earth, has been adopted by all antiquity—exemplified in the Hebrew sacrifices of the Old Testament, Genesis xxii.; Exodus xix.; Hosea iv. 13; Kings xvi. 4; Ezekiel xxviii. 14; and the Mount Olympus of the Greeks, where the Pagan deities held their court. In the system of the Gnostic Valentinus, the supreme fountain of Being is described as dwelling on some invisible and unnameable heights,¹ which seems to have originated in the ancient idea that one part of the world was higher than any other, the divine and imaginary “Meru” of the Hindus, and “terrestrial paradise” of the Christians, adjoining heaven.

It would be difficult to say when, or with whom, the sanctity attached to Adam's Peak arose, or how it came to be connected with either Adam or Buddha. Although the native legends regarding its connection with Buddha are not so old as was supposed, some wide-spread reports about idolatrous veneration of the Peak must have been circulated at a very early period, as shown by the remarks of Fa-Hian, and the Patriarch of Armenia, the latter anathematizing it as belonging to Satan.² The “Raja-tarangini,” or Kashmir chronicle, records a fabulous expedition to the Peak (A.D. 24), undertaken by Meghavana, one of their kings. However, there is no mention of either Adam or Buddha, the mount being called the mountain

¹ Irenæus.

² *Vide* ch. ix.

of gems.¹ But the most remarkable of all the legendary visitors was the renowned Macedonian conqueror, Alexander, whose alleged voyage to Serendib, and devotions at the sepulchre of Adam, are described by Ashref, a Persian poet of the fifteenth century. Sir W. Ousley, who quotes him, remarks that oriental writers have placed Alexander in every region of the ancient world, but he thought it not improbable this conqueror was in the island.

It has been suggested that the sanctity attached to Adam's Peak originated with the aborigines, who are said to have worshipped the sun,² and Jacob Bryant, in his *Mythology*, traced this veneration to the worship of "Ammun," the sun, an Egyptian deity, fancying a resemblance in the word "Ammun" to Hamanella, or Hamal-cel, which are merely Portuguese and Dutch corruptions of Salanala, or Samanhela, native names for Adam's Peak, of which he did not seem to have been aware, saying, "Ham-al-eel literally means Ham-the-Sun."³ However mistaken in the meaning of this word, he may not have been very far wrong in the idea, shared by Wilford, that many Egyptian doctrines and sciences were anciently imported into India. The latter quotes an Indian legend, that some time after the invasion of Rāma, Maya came from the west to honour the sun on Salanala (*vide* ch. vii., p. 122); and there is some reason to suppose the modern name of Dondra head is a corruption of Agna, a Sanskrit word for the sun, or a sacrificial fire, occurring in the "Vedas" (*vide* ch. xii., p. 262). Ptolemy mentions a "solis portus," and Pliny an "insula solis," in the island.

As far as Buddha is concerned, the legend of his foot-print on the Peak does not appear to be older than Fa-Hian (A.D. 400), and he seems to have brought it from China (*vide* ch. x.), as it is not mentioned in Nepal and Burmese versions of Buddhist scriptures, nor in the "Dipawanso;" the statement in the "Mahawanso" (ch. i.) being either an interpolation or an invention of Mahanamo. A tradition, current in the

¹ Pp. 71, 79. (*Vide* ch. vii.)

² Baldens, iii. 667.

³ Bryant's *Mytho.*, Camb. 1767, quoted by Sir E. Tennent, ii. 132; the Dutch called one of their forts near Jaffna, Hams-cel.

locality, attributes the discovery of the foot-print to King Walagambáhu, B.C. 140; and the Peak is mentioned under the name of Samanta pasadika, in Buddhaghosa's "Atthakatha," on the "Vinaya Pitaka," A.D. 482.¹ Although not noticed in the "Ramayana," the Sinhalese name "Samanta Kúta" seems to be derived from Saman, brother of Ráma, one of the heroes of the poem, and according to the "Rajavali" (p. 208), a guardian Devo of the peak. Still more fabulous is the statement in the "Buddhawanso," that the first Buddha of the present dispensation (B.C. 3101), visited Adam's Peak when the island was called Oja Dipa, and the peak Dewa Kúta; also by Konagama Buddha (B.C. 2100), when it was named Saman Kúta, and Wara Dipa.² The hill of Mihintala is probably the most ancient scene of Buddhist worship in the island. Reliable Sinhalese or Hindu accounts of pilgrimages to Adam's Peak are comparatively modern, being first mentioned in the "Agni Purána," about the ninth century A.D.,³ which calls the peak Sri Salia, and dedicates it to Seva. Sinhalese chronicles mention that Prakrama Báhu I., in the middle of the twelfth century, made a pilgrimage to the shrine; also Kirti Nissanga, and Prakrama Báhu III., in the fourteenth century.⁴

Some of the Chinese authorities, dated A.D. 1400, quoted by Sir E. Tennent, have connected the mountain with a personage named "Paw Koo," supposed to be Adam, and say the gems found on the peak are his crystallized tears, which accounts for their brilliancy; but it seems, as well as several other Chinese statements, to refer rather to Amitabha Buddha, or Kwan yin, one of their deities, supposed to reveal himself occasionally among the mountains of Ceylon. (*Vide* ch. xxiii.)

A proof of the antiquity of the strange traditions concerning the peak is found in the insertion of the word "Sarnedib," instead of Ararat, in the Sarmatian version of the Pentateuch, as

¹ A long account of the Peak, and the native legends, was published by W. Skeen at Colombo, 1870.

² Mahaw. p. 88; Kúta is a corruption of Kanda, Sinhalese for a mountain or the Telengu Konda.

³ Wilson's Analysis, J. A. S. B., 1832, p. 82.

⁴ Rajavali, p. 254; Hardy, p. 212.

the place where the ark rested. This version, which was brought from Damascus, in 1616, by Pietro della Valle, an Italian traveller, is stated by the Sarmatians to have been composed by Nathaniel, one of their priests, who lived twenty years before Christ; but Davison, in his "Biblical Criticism," says it is most probably not older than the second century A.D., and, in common with most ancient Targums or paraphrases, contains several departures from the text of the original Hebrew, the translator having substituted comparatively modern names for some of the ancient, as in the instance quoted, Genesis viii. 4. The Chaldaic version, or Targum Onkelos, has "Cardu" in place of Ararat, but the word Serendib does not occur, as stated in Dr. Kitto's "Biblical Cyclopædia," in the Sarmatian Pentateuch, a very much older work,¹ supposed to have been written in the time of Rehoboam (B.C. 975), when the tribes of Israel separated. Sir E. Tennent, who has pointed out this mistake (i. 551), says, "there is another MS. written on bombasin, in the Bodleian library, No. 345, an Arabic version of the Pentateuch, about the year 884 of the Hegira, ascribed to Aba Said, which also has Serendib (Gen. viii. 4); but the word is not found in the Sarmatian Pentateuch of the Paris Polyglot, or in the five MSS. in the Bodleian library, Oxford." Fabricius, in the supplemental volume of his "Codex Pseudepigraphi veteris Testamenti," Hamb. 1713, says, "Samaritæ, Genesis viii. 4, tradit Noë arcam requievisse super montem Serendib, sive Zeylan" (p. 30), and it was possibly upon this authority that the statement was made in Dr. Kitto's Cyclopædia. Fabricius also mentions that relics of the ark are stated to have been found in different parts of the East; for instance, at Cape Comorin, and Cairo, where a nail belonging to it is said to have been obtained; and the Persians say the ark rested near Erivan (ii. 68).

An idea has existed in the East that the deluge never reached the top of Adam's Peak, and that it is a relic of the ancient world, which may account for the veneration attached to it among Mahometans. It is not improbable that Adam's Peak is older than Ararat, it having been conjectured that the

¹ Vide Walton's Polyglot, 1657.

deluge of Noah was caused by the elevation of the Caucasus, and the formation of the volcanic cones of Ararat.¹ Adam's Peak was probably standing before the Himalayas were raised, and when England and Europe were half buried beneath the ocean. (*Vide* ch. iii).

M. Dulaurier, in the "Journal Asiatique" for 1846, has sought out a very far-fetched source of the legend of Adam's Peak in the famous Gnostic manuscript called the "Faithful Wisdom,"² where the Saviour is represented as informing the Virgin Mary that he had appointed the spirit Kalapatauroth as guardian over the foot-print (*skemmut*) impressed by the foot of Ieû, who surrounds all the Æons; also the Himarménè custodian of the books of Ieû," &c.³

The vagueness of this passage, and the evident confusion of persons, is such that it requires a considerable stretch of the imagination to connect it with either Adam's Peak or his foot-print. Although M. Dulaurier says *skemmut* means foot-print, Schwartz, the Latin translator of the MS., leaves this word as untranslatable; neither is it at all clear that Ieû means Adam; although Ieû is called *primus homo* in a previous passage. In all other parts of the work Adam is mentioned under his proper name.

Sir E. Tennent, who adopted Dulaurier's idea,⁴ says: "Ieû was the primeval man, whom the Gnostics placed next to Noos and Logos, as the third emanation from the deity." This

¹ Figuiet, *Anted. World*, p. 418.

² Cette tradition, qui est d'origine bouddhique, passa aux Musulmans, qu'il accommodèrent à leurs idées. Elle est consignée, en effet, dans le fameux MS. gnostique de la fidèle Sagesse," p. 175. This MS., which is in the British Museum, was brought from Egypt by Dr. Askew, and appears to be as old as the fifth century, being a translation in Coptic of the Gnostic work in Greek which has perished, attributed by Tertullian in his treatise *De Præscriptione* to Valentinus, the great heresiarch who lived at Alexandria in the second century. The MS. was first translated into Latin by Schwartz, and afterwards into French, in 1840.

³ "Et posui Καλαπαταυρωθ αρχοντα qui super skemmut, in quo est pes Ieû, et iste circumdat αιωνας omnes et ειμαρμενας; αρχοντα illum posui custodientem libros Ieû de κατακλυσμος," "Pistis Sophia," p. 221.

⁴ "Ieû, qui est l'inspecteur de la lumière, est considéré aussi comme le premier homme, c'est-à-dire, comme le protoplaste ou Adam," p. 175. There is a Malay version of the "Ramayana" in which the mountain of Serendib is connected with Adam, an interpolation of the Mahometan translator. (Tennent, ii. 133).

seems to be a mistake. The Æons, of which Noos and Logos were the first, in the system of the Gnostics and Valentinus, had no reference to Adam, but were certain spiritual essences, thirty in number, supposed to have proceeded by emanation from the one fountain of Being, (an Eastern idea,) long before the creation of this world. One of the last of these Æons was named Sophia (or Wisdom), from whom the MS. evidently derives its name.

Although we may dismiss, as quite fanciful, any reference to the foot-print of Adam in this work of Valentinus, it is not improbable that the idea among the Mahometans is of Buddhist or Gnostic origin, and that Arabian mariners visiting Ceylon, hearing of the foot-print of Buddha on the mountain, transferred it to Adam. Particular veneration for our first parent is inculcated in the Koran, a work largely infected with Gnosticism, as it is well known Mahomed put their heterodoxical works under contribution when composing it, and at the dispersion of the Gnostics under the persecution of the Roman Emperors, many of them took refuge in Arabia, and embraced Mahomedanism.¹

Wilford, in his essay on the "Sacred Isles," mentions an Eastern idea that Adam was buried in a tomb on the top of the highest mountain in the world (that is, Meru), which the Mahometans may have confounded with Adam's Peak. Marco Polo, and several mediæval travellers, speak of it as the tomb of Adam, making no allusion to Buddha, or a foot-print. (*Vide* ch. xii.)

The earliest mention of the foot-print of Adam among Arabian and Persian writers is found in Tabari, (A.D. 898.) Ibn Batuta remarks that the Chinese "cut out the big toe with that next to it, and deposited them in the town of Tseu-Thoung, in China."

Friar Odoric and Sir Thos. Herbert speak of a lake on the mountain formed from the tears of Adam and Eve for the murder of Abel. The Mahometans have a legend that the

¹ Among the dreams of the Gnostics adopted by the Mahometans is the one that Cain and Abel had twin sisters called Calamana and Lebor. J. Asiat. 1853. Fabricius, Codex Pseu., supp. v. 44.

tears flowed in such torrents from Adam's eyes that the right formed the Euphrates and the left the Tigris.¹

Duncan, in the fifth volume of the "Asiatic Researches," gives a translation of an Arabian work written in 1579, which states that the Arabs made pilgrimages to the Peak before Mahomet wrote the Koran? "A party of Dervises on their way to Ceylon, touching at Cranganore, in Malabar, converted the Raja Sri Perimal into a disciple of Mahomet, who was then at Mecca, by relating his recent miracle of dividing the moon about the year 620 A.D." However, the miracle of the moon was invented by Mahomet's followers long after his death, and the statement appears to have been taken from the "Tohfut-ul-Mujahideen's" account of the settlement of the Moors in India, which says "that these Moslem pilgrims arrived at Cranganore 822 A.D., nearly 200 years after Mahomet's death; but it was erroneously believed by Mahometans that this king was converted during their Prophet's lifetime." If this be true, it helps to fix the date when Mahometan pilgrimages to the Peak began, something less than 100 years earlier than the date assigned by Ibn Batuta. (*Vide* ch. xii.).

De Faria, the Portuguese historian, mentions the alleged conversion of Perimal to Islam and his pilgrimage to Mecca, adding, it was a false invention of the Moors, as this king gave up his crown to become a Christian, and died at Meliapor, near Madras, 588 A.D., although, according to another doubtful account, he was one of the three kings who went to Bethlehem.

Sir Thomas Herbert (1634) repeats this statement of De Faria, but calls him King of Ceylon (*vide* ch. x., p. 216). It is doubtful there ever was a Christian king of Malabar, although there is a tradition to this effect among the native Christians at Madras.

Maffei, De Couto, and other Portuguese, have claimed the honours of the Peak for the eunuch of Queen Candace² and

¹ Wiels., Bib. Legends, p. 16.

² Haud absimile videtur in eo vestigio coli eunachum Candaceo Æthiopum Reginæ quem Dorotheus Tyri episcopus in Taprobana Christi Evangelium promulgasse testatur." Hist. Indi., lib. iii. 61. (*Vide* ch. xxiii., p. 95.)

St. Thomas, but they seem to have confounded the Apostle with Buddha: among the reasons for their idea, De Couto says, there was a stone in a quarry near Colombo impressed with the mark of the knees of St. Thomas very like the one at Meliapore:¹ but the natives have a legend that it was formed by Buddha.

The foot-print on Adam's Peak is not the only thing of the kind in the world. Lyons, in his "Republic of Mexico" (i. 284), says: "The inhabitants of Mexico exhibit an immense block of porphyry, which they affirm was indented by Montezuma's foot." Herodotus records having seen a gigantic footprint of Hercules on a rock near Syras, in Scythia, but it has not been noticed by any subsequent traveller; and Ibn Batuta mentions that at Damascus there was a mosque containing a stone bearing the footprint of Moses, much venerated by Moslems (p. 30).

Ancient pilgrims in Egypt are said to have drawn outlines of their feet in holy places, still to be seen on the platform of the great temple of Philæ.²

Hwen Thsang speaks of several foot-prints of Buddha in India, and there is one in a temple at Behar venerated by Malabar Christians as that of St. Thomas. The Siamese also say there is one at Prabat, near Bangkok, and that Buddha stepped there from Adam's Peak.

Willebald, an Anglo-Saxon traveller to the Holy Land, 761 A.D., mentions seeing in the prison of Catania, in Sicily, the "shoe-prints" of St. Agatha. Then there is the hollow in the church of the Ascension on the Mount of Olives, mentioned by Arculphe, a traveller of the seventh century, and by Padre, F. Bernardino Firenze, 1620. This church was turned into a mosque by the Mahometans, but has long since fallen into ruins.³

Thomas Hood, in his "Cornish Legends," says: "The giant Bolster is related to have stepped from one mountain to another some leagues distant." Can there be any connection

¹ Dec v. lib. vi. 18

² Charton, Voy., i. 132

³ *Idem*,

between this legend and those of Buddha? In Friar Mauro's map there is a drawing of the Peak and foot-print.

Journey to the Peak.—According to the "Asiatic Journal" (i. 442), as quoted by Sir E. Tennent, Lieutenant Malcolm, Ceylon Rifles, was the first Englishman who reached the summit of this mountain (April, 1827); the date he gives is a mistake,—it was in 1815. Dr. Davy ascended it in 1817, and Colonel and Mrs. Walker, of the 61st Regiment, paid it a visit in 1820. This lady's interesting account is published in Hooker's "Companion to the Botanical Magazine," 1835.

In paying a visit to the Peak from Colombo there are several ways of reaching Ratnapoora on the Kaluganga, the point of departure for climbing the mountain. The distance from the coast to the summit is about sixty-five miles, the greater part being across a flat country. Ratnapoora is a fine village situated in a valley on the banks of the river in the midst of exquisite scenery, and is about eight miles in a straight line from the Peak, but the winding road is more than twice as long. Leaving this place early in the morning the traveller proceeds by a bridle-road to Gillemale, where there is a little green plain among the forest trees, a few native huts, and a rest-house; from hence the rugged up-and-down path passes over the hills which form the base of the mountain, crossing numerous noisy streams, dashing and foaming through chasms and ravines so narrow, nothing but the blue sky is seen between them, and the hills and valleys are covered with forests so dense that the sun is almost excluded, and the path winds along in deep solitary shade, occasionally broken in places as a gleam of radiance falls through an opening overhead, showing how brilliant is the sunshine above.

Notwithstanding the shade these jungles are close and sultry, being filled with hot vapour, drawn out of the rank vegetation by the powerful sun. Numerous convolvulus, *Nepenthes*, *Melastoma*, *Osbeckia*, and dwarf bamboos, compose the undergrowth; and frequent tracks of elephants, leopards, and wild pigs, cross your path; while the swarming land-leeches defy all attempts to keep them off.

Between Gillemalle and the Peak the country rises rapidly ; and as you reach the higher points and look back towards the sea, grand and lovely views are obtained over the hills and plains below. Approaching Palabaddula the path passes round a number of scarped acclivities, so steep a stone falling over their sides can be heard bounding among the rocks below long after it disappears from sight through the trees. Sheds and resting-places for travellers are erected at intervals, and occasionally a small temple or altar to receive the offerings of the pilgrims and incite their devotion.

Palabaddula is the last inhabited place on the mountain where there is a hamlet, a rest-house, and a Vihara containing a copper model of the foot-print, *a fac simile*, it is said, of one in gold which formerly covered the print on the apex of the cone. A great difference in temperature is felt at this place, particularly at night, and the creeping plants which cover the trees lower down yield to mosses and ferns, while rhododendrons and *Impatiens*, with their curious scarlet flowers, become abundant.

From Palabaddula all proceed on foot, no other mode of travelling being possible for the rest of the way : about a quarter of a mile from it you pass a torrent on a plank, and then up a steep ascent through a gloomy forest, which ends in a little precipitous platform or tableland called Deabettie. Until the tiring traveller reaches this place he seldom gets a view of the summit of the Peak, being hidden by clouds, intervening hills, and the dense foliage which overhangs the path ; but, on reaching this spot, “ the majestic cone presents itself towering into the sky with unsurpassed grandeur, there being still three miles of tremendous acclivity before you reach the summit.”¹ John, of Marignolli, in 1849, remarks : “ On the way down there is a fine level place still at a great height where you find, first, the mark of Adam’s foot, secondly, a statue² with the left hand on the knee and the right hand raised towards the west ; lastly, the house which Adam made

¹ Tennent. The Asiatic Journal, 1816, p. 442, says “ it was supposed to be 15,000 feet high, until Dr. Davy ascended it.” See p. 21.

² Cathay, p. 358.

with his own hands." The fine level place is evidently Deabetine, and the statue the figure of a man, or Buddha, traced on the side of the rock: but Adam's house no longer exists in the eyes of the present unbelieving generation.

Ibn Batuta, in his journey to the Peak, says, "we came to a place called the 'seven caves,' and after that to the 'ridge of Alexander,' at which place is the entrance to the mountain. When we ascended we saw the clouds passing between us and the foot." The seven caves and the ridge of Alexander cannot now be identified, unless he meant the deep ravines and the great mass of granite near Deabetine. The air at this place, from its great elevation is cold and damp, the thermometer ranging from 49° to 60°.

Dr. Davy describes some grand and curious optical phenomena that sometimes occur on the mountain during thunderstorms and dense mists, which appear like frozen rivers and lakes. During the monsoons the Peak is quite sublime, while the lightning flashes around it, revealing through the gloom at intervals the mighty rock that crowns the summit.

On leaving Deabetine, the path at first descends through ravines to a large torrent named Sitaganga, a branch of the Kalu which flows over enormous masses of granite. It is usual for native pilgrims to purify themselves by bathing in this stream before they approach the footprint. Wild fruits are sometimes found in it, which, legends say, proceed from a garden Adam or Saman had somewhere in the vicinity, and that any adventurous explorer, tempted by curiosity to try and discover it, never returns. Passing the stream, the ascent recommences up four flights of rude steps cut in the solid rock, the last containing about ninety steps, there being nearly 200 in the whole.¹ It is not known when they were made, only the "Raja-ratnacari" (p. 131) says "they were cut by a Sinhalese king, who made a pilgrimage to the Peak, and noticed the difficulty of ascending it." Probably Prakrama Báhu I, whom the chronicles mention, went there in the twelfth century. They were considered old even in Batuta's time. He remarks,

¹ "Buddhists believe the steps cannot be counted correctly, and the same belief exists in England about the stones of Stonehenge." Skeen, p. 171.

the ancients have cut something like steps upon which we may ascend (p. 189). The path next leads through a steep ravine, formed of huge blocks of brown ironstone, to the base of the stupendous rock, more than forty feet high, and almost perpendicular, which forms the pinnacle of the Peak. From this point further progress would be impossible to any ordinary person without the aid of the iron chains secured to the solid granite. How the first adventurers got over the difficulty has not been explained; but the first traveller who mentions chains is Marco Polo, 1292: then Ibn Batuta about fifty years afterwards (*vide* ch. xii. p. 261). There are several of them fastened to the rock with different shaped links, some appearing much older than others, and may be the same described by the Mahometan more than four centuries since; but their origin is unknown. Some of the newer chains are said to have been the gift of rich pilgrims to replace others worn out. Sir W. Ousley says, Ashref, who wrote a poem on the conquests of "Eskander," ascribes these chains to the Conqueror and the philosopher Bolinus, who devised them—"fixing chains with rings and rivets of brass and iron, the remains of which exist to this day, so that travellers by their assistance are enabled to climb the mountain of Serendib and obtain glory by finding the sepulchre of Adam, on whom be the blessing of God." Unfortunately for the accuracy of the poet, the philosopher Bolinus, so far from being a contemporary of Alexander, lived several centuries after him, having been no other than Apollonius of Tyana,¹ a maker of magical talismans.

As one climbs up this fearful ladder the timid must not hesitate lest a gust of wind should blow the adventurous climber from his holding, neither should the eyes be turned downwards into the abyss below for fear of being seized with giddiness. As Ibn Batuta well remarks: "The frightful notion seizes one that he will fall." The last step is the worst of all, as one lands at a very awkward corner on the terrace, or ledge, surrounding a mass of rock about nine feet higher in

¹ Porocke, Hist. Dynast. Oxford. 1663, quoted by Sir W. Ousley, Trav. i. 57. (*Vide* ch. ix.)

the centre, which forms the extreme apex of the mountain, on the top of which is placed a picturesque little wooden temple, secured from sudden gusts of wind by chains fastened to the rock. Inside the temple is the "Sri pada," or footprint, apparently a natural indentation in the rock, artificially made to assume the shape of a man's left foot, with mortar to make up the outline, about five feet long and two and a half broad, over which is placed a brass cover, a substitute for the original in gold, which has long since disappeared.¹

The terrace which forms the summit of the Peak is 7420 feet above the sea, of an oval form, sixty-four feet by forty-five, and surrounded by a wall five feet high. Besides the temple there is a small shed with two compartments for the priests in charge of it, who usually reside in the hamlets lower down the mountain. Raja Singha I., when he became a Brahmin, installed some Anadec Fakers on the shrine, who were afterwards expelled and the Buddhists re-established in their old charge.²

During the time of the annual pilgrimages in March, when hundreds of both sexes, including many Malabar Christians, clamber up the sides of the Peak, the ceiling of the temple is hung with white cloths and decorated with flowers, while the perfume of the champac and sandal floats through the air. The worship consists of offerings of rhododendron flowers,³ short invocations accompanied with genuflections, and shouts of "sadoo" (amen), the whole concluding by ringing a bell and partaking of some very cold water from a spring on the northern side of the rock, a little way below the summit: it is stated that leaves of trees are sometimes found in it, and the pilgrims believe that they are turned up from Paradise, there being a supposed communication between them. Marignolli mentions this idea. (*Vide* ch. xii.)

Notwithstanding the varied religions professed by the crowd on these occasions and the rival claims to the foot print,

¹ Baldeus, iii. 650.

² Turnour, "Epitome," p. 51.

³ More substantial offerings are also made to the priests for their support, amounting, it is said, to from 250*l.* to 300*l.* per annum.

there is no discord—all seems awed into peace and good-will by the sublimity of the position and the grandeur of the scene around them. And well they may, as the panorama from Adam's Peak is one of the grandest in the world; for it has been remarked although people climb many mountains much higher there are few which present so unobstructed a view over land, or towers so much over the surrounding mountains.¹

On the north and east the eye ranges over the Kandyan hills, turning to the south and west are undulating plains of light and verdure, with rivers showing out at intervals in their silvery course, while in the extreme distance the glitter of the sun on the surf marks the line of the coast. This grand view is frequently eclipsed by clouds or dense mists which envelope the summit when neither land nor sky can be seen, the mountain appears to melt away under your feet and you feel suddenly lost in a cloud, without a footing on earth. The sensation which it produces is very peculiar, and must be felt to be understood. There is a common belief among the pilgrims that water is found in the hollow of the footprint which cures all diseases, many who are afflicted resorting to the mountain on this account.

This belief is mentioned in several Chinese books. The records of the Ming dynasty (A.D. 1522), quoted by M. Pauthier in his edition of Marco Polo, p. 588, says, "Au milieu de cette empreinte il y a une légère couche d'eau, qui ne se dessèche ni ne tarit pendant les quatre saisons de l'année. Tous ceux qui sont à la portée y trempent leur main pour en bassiner leurs yeux et laver leur visage, disant que l'eau de Foe purifie et enlève toutes les souillures." Sir E. Tennent quotes another MS., dated A.D. 1350, which says that "invalids recover by drinking from a well at the foot of the mountain (i. 609). The Ming-see also states that in the same place there was a temple which contained the body of Buddha, with many of his relics, and, according to tradition, he was absorbed from thence into Nirvana," which is contrary to the usual Buddhist

¹ Tennent.

statements that he died at Kusinaria, in India, and seems to refer to Kwan-yin. (*Vide* ch. xxiii.)

The descent from the Peak is accomplished by the same route the visitor ascends as far as Ratnapoora, here travellers usually take a boat and descend the Kalu to Caltura. The boats are made of two trunks of trees hollowed out and fastened together at some distance from each other by a platform covered with a bower of leaves. The upper part of the Kalu, named from its dark colour, is full of rapids and has a very strong current, which carries a boat rapidly to the coast, but on their return they are dragged with great toil over parts of the river by ropes. Nothing can be more rich and beautiful than this river's scenery, presenting every characteristic of the tropics.

CHAPTER XXII.

LITERATURE AND ARTS.

Books and Writings.—The books of the Sinhalese are made of palmyra or talipat leaves, called “olas.” A number being cut the same length and placed over each other, with a piece of thin wood or ivory above and below for covers, a string runs through a hole made in the covers and all the leaves at each end, which are thus strung together, something like wooden window-blinds. These books are of various lengths and thickness, but the breadth of all is about the same : some of the larger ones are nearly three feet long, two and a half inches broad, and contain many hundred leaves, with eight or nine lines of writing on each. The best kinds are said to last for more than 500 years. Their preservation for so long a period being attributed to the aromatic quality of the *dumfia* resin used for making the black varnish rubbed into the marks made by the style employed to trace the letters on the leaves.

Talipat leaves are prepared for writing by boiling or steeping in hot water or milk, after which they are dried, pressed, and smoothed with a piece of wood having a sharp edge ; a considerable amount of care is bestowed in preparing the finer kinds, which are highly polished. Olas are also used for keeping accounts by shopkeepers in Ceylon, India, and Burmah. When rolled up and secured with wax they were formerly sent through the post-office as letters. Pliny (xiii. 21) remarks “ that the most ancient way of writing was on palm leaves, hence the term *folium*, or leaf, applied to books ;” and Prescott, in his “ History of South America,” says, “ the Mexicans, before the

arrival of the Spaniards, used the leaves of the aloe for writing on, made into books shut up like a fan."

Contracts and legal documents are often engraved on silver, ivory, or copper tablets, similar in shape to olas. An inscription on the rock at Dambool (A.D. 1200) records that permanent grants of land should be engraved on copper-plates, so as to endure for ever and be beyond the power of rats and mice.

A school was established in every village by Wijayo Báhu III. and others at Pollanarrua by Prakrama,¹ and we may infer that writing was not exclusively confined to the priesthood. The "Rajavali" (p. 189) says, the king's brother (B.C. 200), who was taught by a Tirumansi, could write almost as well as himself, and the writing of letters by princesses and others is several times mentioned in the Chronicles; still the clergy were doubtless the chief depositories of learning, the study of the Pali was obligatory on their order, and the literature of the ancient Sinhalese is almost exclusively ecclesiastical. At the present time elementary education is not uncommon among Buddhists, there being usually a school attached to each Pansala: in Burmah every person is said to be able to read and write.

The "Asiatic Researches" (vii. 422) alludes to a tradition in the island that the art of writing was known there in the time of Asoka. The Rev. S. Hardy thinks it must have been introduced after the language at present in use was formed.² However, it is doubtful if any of the legends or doctrines of Buddha were committed to writing in Ceylon until 104 to 70 B.C., or about one hundred and fifty years after the introduction of his creed into the island, during that interval being taught orally.

* In India also Buddha's doctrines appear to have been communicated traditionally for a long time. After his death, we are told, three or four convocations of learned priests were held at intervals in India, where the discourses delivered by Buddha were recited by those who had committed them to

¹ Upham, Maha, p. 274.

² Legends of the Buddhists, p. 25, ed. 1866. East. Mon. p. 160.

memory, and any errors detected were corrected, and thus handed down for several generations. The first of these assemblies was held under the auspices of Maha Kasypa, Buddha's successor, two months after his death; and the last, attended by many hundred priests, in the reign of Asoka, about B.C. 250, when the recital and arranging of the traditions occupied nine months.¹ They must have been possessed of almost incredible powers of memory to have accurately retained the great mass of legends contained in their books, and the statement can only be received with the greatest suspicion. The accuracy of the "Mahawanso's" description of the councils is doubted, as the northern and southern MS. do not agree about them; also Fa-Hian makes no mention of the great council said to have been held at Pataliputra in the reign of Asoka, yet he resided there for three years at the very time that Buddhaghosa was compiling the "Atthakatha" in Ceylon.²

A fourth council known only to northern Buddhists, and the last according to them, is said to have taken place in the reign of Kanishka, Raja of Kashmir, *circa* B.C. 143 to A.D. 45. (*Vide* note to the Calcutta edition of the "Lalita Vistara.")•

- The period when the doctrines thus collected and arranged were first committed to writing is lost in the mists of time: no Indian Buddhist works can be traced farther back than A.D. 76, when the "Lalita Vistara" was translated into Chinese, but this work may have been compiled or written B.C. 150.³ A species of Sanskrit called "gáthá" occurring in the "Lalita" led Burnouf to suppose there was another digest of Buddhist literature, besides those named, when the doctrines were compiled in gáthá, but has been lost.

Although the Buddhists of India may not have committed their doctrines to writing until the period surmised, it is clear they were acquainted with letters or symbols at the time of Asoka, which is shown by the Girnar inscriptions, and the "Mahawanso" (ch. v.) mentions incidentally "that despatches

¹ Mahaw. ch. iii. , xxiii. J. A. S. Beng., 1837, vi. 684; vii. 279, 714. •

² Beal's Fa-Hian. Also spelt Arthakathá and Buddhaghósa.

³ Prof. Wilson, J. R. A. S. xvi. Burnouf, "Hist. du Bud." (*Vide* ch. x.)

were sent to Asoka ; also (ch. viii.) that Wijayo sent a letter to India." (*Vide* note, p. 32.)

The doctrines of Buddha appear to have been arranged in verse, and, as has been explained (ch. vii.), this kind of composition is exceedingly obscure and requires an explanatory commentary, called "*Atthakatha*," the text or *Pitaka* being comparatively worthless without it. The commentary appears to have been also recited and revised at the convocations.

When Mahindo or Mahendra came to Ceylon, in the middle of the third century B.C. for the conversion of the island to Buddhism, he is said to have carried in his memory the whole of the commentary on the text of the "*Pitakas*," and promulgated them in the native language, but whether the commentary was written out by him, or not, does not seem to be quite clear. The "*Mahawanso*" says, the "*Pitakas*" and "*Atthakatha*" having been collected and settled at the third convocation (B.C. 246) were brought to Ceylon by Mahendra, who promulgated them orally . . . but between the years B.C. 104 and 76, to prevent the perversion of the truth, the priests recorded the same in books" (ch. xxxii). Turnour was of opinion the "*Atthakatha*" was brought in writing from India by Mahendra, and the Buddhist doctrines reduced to writing from the commencement of his mission in Ceylon, a fact kept concealed by the priests to enhance themselves by a supposed gift of inspiration.¹

A statement occurs in Buddhaghoso's commentary on the "*Brahmagala sūtra*" where he says, "a commentary on this portion of the Buddhist canon, existing during Sakya's lifetime was rehearsed and settled at the first council after his death, and carried to Ceylon by Mahendra, where it was translated by him into the Sinhalese language," leading to the idea that Buddhist doctrines were committed to writing much earlier than is supposed. However Mr. Childers, who referred this question to the Ceylon priests, obtained the explanation, that Buddhaghoso most probably only meant an oral version, where the meanings to be attached to various words or terms taken from the Hindu Pantheon were settled ; *Atthakatha*, of

¹ J. A. S. Beng., 1838, p. 922.

council, being derived from "*attha*" (meaning) and "*katha*" (statement).¹

The only authentic written version of the "*Atthakatha*" now extant in Ceylon (probably in the same wording as when composed) is that compiled in Pali by Buddhaghoso, A.D. 420, from documents in Sinhalese, which have perished. Buddhaghoso was a Brahmin, who became a convert to Buddhism in India, and sent to Ceylon to make a translation of the Sinhalese "*Atthakatha*," as the commentary on the Pali text of the "*Pitakas*" was not to be found in the peninsula. On his arrival in Ceylon the priests were at first unwilling to give him their commentary, but became afterwards so charmed with his learning they called him "*Buddhaghoso*," the voice of Buddha himself.²

Max Müller, in the preface to the "*Parables of Buddhaghoso*," and commentary on the "*Dhammapada*," referring to a previous opinion on this subject in his "*Chips from a German Workshop*," says, "it was in deference to an over cautious criticism that I have claimed no earlier date than that of Buddhaghoso for the curious relics of the fable literature of India, as a scholar might refer the date of the parables to the third century B.C., without exposing himself to much criticism. Buddhaghoso's version may be part of a more ancient work, perhaps that of Mahindo."

According to Burnouf, the oldest Buddhist documents to be found are the Sanskrit versions of Nepal, and after them the Pali of Ceylon; but there is some reason to suppose that the Sanskrit texts of India were taken from the Pali.³

Buddhist scriptures are called in Pali the "*Tripitaka*," (three *Pitakas* or Treasuries⁴;) one relates to *Vinaya*, or discipline; another to *Abhidharma*, or metaphysics; the third containing *Sûtras*, or discourses. They are exceedingly voluminous, the text of the "*Pitakas*" contains 592,000 stanzas, written on 4,500 leaves, and the commentaries nearly as many more.

¹ J. R. A. S. v. 291. New series.

² Mahaw. ch. xxxvii. 252.

³ Mr. Childers, J. R. A. I., v. 227. Parab. of Bud. ed. 1870, pref. xvii. *Chips*, &c., i. 196.

⁴ Also called the *Pitakattaya* or "three Baskets."

The most popular of the "Pitakas" are the legendary tales (Sûtra Pitakas or Jâtakas), supposed to have been related by Sakya in his Sutras, describing among other things the numerous transmigrations through which he passed preparatory to attaining the Buddhahood. Of late years great progress has been made in translating Buddha's Sûtras into English and other European languages, many by the Revs. Hardy and Gogerly, in local and other periodicals. The recent numbers of the "*Journal Asiatique*," Paris, 1870 to 1873, contain the "Parita," by Gogerly; and other French versions by Grimblot, &c. The Rev. S. Beal has also translated some Chinese versions. One is struck in reading these legends with the admirable morality¹ generally inculcated in them, and the resemblance many of the narratives bear to those in the Bible, and some of the fables of Æsop. The Judgment of Solomon (Kings, iii. 16) has a parallel in the Jâtakas: "a woman who was bathing left her child on the banks of a river, when it was stolen, but discovered afterwards in the possession of another woman. Both appeared before Buddha claiming the child; he ordered them to pull it in opposite directions by the legs—it of course began to cry, when the real mother pitying the infant resigned it to the other woman, when the judge decided in her favour."² The religious repose of the kingdom of Asoka under the influence of Buddhism resembles the period of peace foretold in Isaiah (xi. 6, 7, 8), "tigers lead forth herds of cattle to graze, elk and wild hogs watched over the fields, mice husked paddy for the king's table, and bears worked with hammers in his arsenals." (Mahaw., ch. v. 23.)

The "Mahawanso," as well as other native chronicles, contain several parodies from the Bible—for instance, that of Elisha satisfying a hundred men with twenty loaves (2 Kings, iv. 42); the transmission of the mantle of Elijah (2 Kings, ii. 13), and the chariot of fire in the same chapter. The passage

¹ Bishop Bigandet says, "most of the moral truths of the Gospel are met with in the Buddhist scriptures," p. 495:—Probably interpolations from western sources. The Tibetan version, called the Ka-gyer, contains 100 volumes.

² Roberts, *Orien. Illus.* p. 191. Hardy, *East. Mona.* Some of the Pitakas will be found in Upham's Sacred books of Ceylon, and Rev. Hardy's Buddhism.

of the Red Sea is parodied in the exploit of King Gaja Báhu (A.D. 109) when marching his army to India, in order to bring back the Sinhalese from captivity in Sollee ("Rajarat." p. 58). There is also in the "Mahawanso" a story which bears a great resemblance to that of St. Hubert of Belgium, and speaks of the washing and anointing of priests' feet by kings (p. 157).

One of the most remarkable of the Buddhist books is called "Milinda Pañha," or "the Questions of Milinda," containing an account of a controversy between Nāga Séna, a Buddhist apostle (B.C. 43), and Milinda, Raja of Ságala or Lahore,¹ a supposed descendant of Selucius Nicator, King of Yona or Bactria, in the time of Asoka, whose name occurs in the Girnar inscription. These Asiatic Greeks have been called "Yons," or Yonikas, but the name is said to have existed in India before the time of Alexander. In the "Milinda Pañha" we find a story resembling the parable of the Sower (Mark, iv. 4.)

The intercourse that existed between Rome and India, from the time of Augustus, and the trade with Alexandria, must have tended to introduce western ideas. (*Vide* ch. ix.) Fergusson, in his "Tree and Serpent Worship," points out the apparent influence of Roman enterprise and art on Indian architecture. But other influences have left a deeper impression on the literature of India. Nestorian Christians were numerous in the peninsula. Then there were the Jews in Affghanistan, the descendants of those carried away in captivity by Shalmanesar, who eventually extended along the western coast of India and founded colonies near Cochin, being known as the black Jews of Malabar. Other colonies of Jews are said to have from time to time settled in Malabar, including a large emigration from Jerusalem when it was destroyed by the Romans (A.D. 68), whose descendants are called the white Jews of Malabar.² There is a tradition among

¹ Turnour, J. A. S. Beng., 1836, v. 530 ; vii. 159. Childers, Pali Dict. p. x.

² Benjamin of Tudela, a Jewish Rabbi, who travelled in India (A.D. 1160), speaks of a Jewish colony in Malabar, and says they were descended from the tribes carried off by Shalmanesar, and had copies of the Talmud. Chartrou's Voy. vi. 10. Friar Odoric, Linschotten, and several other travellers also mention them. Baldeus

the Jews of Cochin that they arrived there in the time of Cyrus (B.C. 540). A Portuguese work, "Noticias dos Judeas," says, seventy or eighty Jews came there from Majorca (A.D. 369). (*Vide* Tohfut-ul-Mujahideen.)

"The laws of Menu closely resemble those of Moses, and it was probably from the Hebrew rolls still preserved by the Jews in India that the Buddhists borrowed the numerous incidents which we find reproduced in Sinhalese books."¹ Roberts, in his "Oriental Illustrations," gives an immense number of instances of similarity between the Bible and the legends and manners of India; and points out the "identity of some of the Hindu idols worshipped by the Tamils in Ceylon at the present day with the deities of Egypt and Babylon. Isis, the Egyptian goddess with cow's horns, finds a parallel in one of Seva's wives, called "Sacti," decorated with a crescent, while the Egyptians and Hindus both worship the bull."

It is related that the officers who accompanied the expedition sent to Egypt from India in 1800, commanded by Sir D. Baird (to assist in expelling the French), were very much surprised at seeing the Sepoys fall down on their knees before the Egyptian hieroglyphics. There is a long article by Colonel Wilford in the "Asiatic Researches" on the connection between the religion of the Brahmins and that of Egypt and an ancient Egyptian colony established in India. Mr. Bryant was of opinion many of the Indian sciences were imported from Egypt.²

The common origin of the Hindu, Greek, Roman, Egyptian, and even Anglo-Saxon idolatry, and the identity of the deities worshipped under different names by widely separated races is now generally admitted. Hindu and Sanskrit mythology is of Babylonian origin, and western gods were brought to India

traces the origin of the Brahmins to Abraham, who sent his sons to the East, Gen. ch. xxv. 6.

¹ Tennent, vol. ii., ch. x., J. A. S. Beng., 1851, p. 376. "The parables of Buddhaghosa show the migration of fables from east to west and back again," Max Müller, pref. vii.

² Asiat. Res., i. 229 ; iii. 295 ; Bryant's Mytho., iv. 256 ; Pritchard's Analysis of Egyptian Mytho.—Asiat. Jour. 1830.

by the Aryans, the same gods being found in the Zend and Sanskrit. The Holi or Dolayatra festivals of the Hindus, which take place in March all over India, resemble the Bacchanalia and Carnival of Rome and Greece, and the May-day festival of the Himalaya that of the sweeps of England.

It has been stated that the doctrines of Christianity are found in Brahmin works or sculptured on Indian temples centuries before our era; but it is doubtful that Hindu legends assumed a written form before the Christian era, the time when they were first reduced to writing being unknown. Sir W. Jones was of opinion that interpolation from Christian and Hebrew sources was practised by the Brahmins. The "Ramayana" is not all original, some passages being interpolated. Buddha accused the Brahmins of corrupting the "Vedas," and Burnouf points out that the term "Krishna" does not appear once in the whole of the Buddhist works read by him: it could hardly fail to have been mentioned by Buddha, had this deity occupied the position among the Brahmins at the time stated, especially as Buddha repeatedly mentions their other gods.¹ If we turn to the rock and pillar inscriptions, almost imperishable documents, none are older than those of Asoka (B.C. 250), and in them there is no mention of Christian, but of doctrines resembling the Jewish. The term "Krishna" has been found in an Aryan Pali inscription on a granite boulder at Khuniara, in the Kangra district, Northern India, attributed to the first or second century A.D., and the earliest instance yet discovered.² Mr. Fergusson has shown that the rock temples of India are not so old as was supposed, none being more ancient than the second century B.C., and there is no other species of temple or edifice as old as the first century of our era. (J. R. A. S. viii.)

¹ Burnouf, *Hist. du Bud.*, p. 136. It must be admitted that "Krishna" occurs in the latest "Braminas," supposed to have been composed B.C. 600.

² J. A. S. Beng., 1854-59. General Cunningham in the *Archæological Survey of India*, J. A. S. Beng. 1863, p. xlix, thinks some of the cave temples were excavated in the time of Asoka, and the whole of them before the third century, A.D., the earthen topes are older than Buddha. "Last year he discovered some Buddhist inscriptions in Asoka characters (supposed to be of the third century, B.C.) containing sentences identical with some in the 'Vinaya Pitaka,' probably quotations from it." Childers' *Pali Dict.* p. ix.

The Greeks knew the art of writing B.C. 800. A public library existed at Athens B.C. 526, and Herodotus lived about the time of Buddha. The *Codex Cottonianus* of the Septuagint version is supposed to be the identical copy that belonged to Origen (A.D. 250). Similar evidences are wanting in India; there is no *bona fide* copy of Sanskrit "MS." as old as Christianity, none of the Purānas were composed before the ninth century A.D., and it is a curious circumstance that neither the words, book, volume, page, nor any term referring to writing can be found in their early works. The earliest mention of anything of the kind occurs in the "*Lalita Vistara*," where Buddha is represented as learning to write.¹ Megasthenes says, their laws were not written, being only oral.

M. Grimblot, the French consul at Galle, during his residence in Ceylon, made a large collection of Buddhist literature, amounting to 14,000 palm leaves, which on his return to Paris were deposited in the Imperial Library, Paris. An account of them by M. Barthélémy Saint Hilaire will be found in the "*Journal des Savans*" for 1866.² In the "Blue-books" for 1870 (xlix. 417) there is a correspondence relative to a project of the Indian government for collecting all the ancient MSS. that can be found both in the peninsula and Ceylon, from which it would seem that the Sanskrit MSS. in the island have been imported from India and are already known, but important Pali and Singhalese MSS. would probably be found in some of the pansalas of the north-western province, from whence an ancient Singhalese copy of the "*Vinaya Pitaka*," or laws of the Buddhist priests, and an account of his relics, quite free from the usual bombast, have been obtained. In many instances the priests are ignorant of the nature or value of the old MSS. in their pansalas; however, the number of important original works in Ceylon is not great, as many were destroyed by Raja Singha I., who burnt great heaps of them when he became a Brahmin (A.D. 1571). Numbers were also taken to Siam at various times, where there is such a store of them an embassy was sent from Ceylon, in 1739, to

¹ Rev. S. Hardy, *Legends of the Bud.* Max Muller, *Hist. Sansk. Lit.* p. 500—17.

² See also the "*Saturday Review*," July 28, 1866.

bring some back. Turnour obtained a second "Ōtika" on the "Mahawanso," and a copy of the "Dipawanso" from Burmah.¹

A public library for the deposit of native works has been recently established at Colombo, which was commenced under the auspices of Sir H. Robinson, in 1869. The Rev. S. Hardy, in the Ceylon branch of the Asiatic Society's Journal for 1848, gives a list of 467 works, eighty of which are Sanskrit, one hundred and fifty Elu, and the rest Pali, including twenty-six grammars, many of them copies of Kachchayano's Pali grammar, a very ancient work, which has been lost. There are very few books in modern Sinhalese, but many of the Pali works are written in the vernacular alphabet instead of the ancient Nāgari. While Mr. Turnour was translating his "Mahawanso," Mr. Tolfrey, another civil servant in Ceylon, was engaged on a Pali grammar and vocabulary, with a Sinhalese dictionary, which his death leaving unfinished was completed and published in 1821 by the Rev. Mr. Clough. A Pali dictionary has been recently published by Mr. Childers, Ceylon Civil Service, the only thing of the kind,² and a descriptive catalogue of Sanskrit, Pali, and Sinhalese works by D'Alwis (1870). In addition to the Buddhist scriptures there are numerous ballads and poems in honour of the Brahmin deities, Seva, Patine, and Ganesa, with many treatises on medicine or kindred subjects in Sanskrit and Pali translations.

Language.—Pali and Elu, or Sinhalese, are both derived from Northern India, being modifications of the Sanskrit. Elu, which closely resembles Pali and Sanskrit (probably introduced from Northern India at a remote period) is supposed to have been the vernacular of the natives when Wijayo landed, the use of the Pali being introduced with his conquest, and the establishment of Buddhism, much in the same way as Norman French became the language of the court, law, and upper classes in England at the Norman Conquest, both being again supplanted by the original vernacular in both islands,

¹ J. A. S. Beng., vi. 1054.

² Trübner's Lit. Record, July, 1870. Knox records a curious Sinhalese proverb, which says, "None can reproach a king or a beggar, as they are both above shame," p. 38.

much changed, however, during the interval by the introduction of many foreign words. Thus modern Sinhalese contains a great admixture of Sanskrit and some Tamil words, proceeding from intercourse with India. Elu is now only used in poetry. D'Alwis says he can with great confidence disprove the statement of Sir E. Tennent (vol. i. 328): "That Sinhalese, as now spoken, and still more strikingly as a written language, presents unequivocal proof of its affinity to the Tamil and Malayan group of dialects." "The Sinhalese language bears no affinity to the Dravidian, being as independent of the Dravidian as the latter is of Sanskrit. Since the Wijayo conquest the inhabitants and language of the island have been so Aryan no trace of the Dravidian is to be found. There is some resemblance between modern Sinhalese and Tamil letters, both being derived from Deva Nāgari; the Sinhalese alphabet now current is not the ancient one, which was probably the old form of Deva Nāgari, similar to the inscriptions of Asoka."¹

The majority of the Sinhalese characters are round, and "the alphabet contains the Sanskrit vowels, but they are unknown to the language itself." With the exception of number eight, "*ettu*," in Tamil "*atai*," in Sinhalese there is no resemblance in the numerals of the two languages, an important feature in the alliance of languages. Modern Tamil, or Malabar, is so little understood by the Sinhalese, and *vice versa*, Government proclamations are posted in the two languages. The Rodiyas speak a dialect quite unlike the Sinhalese, but it is not known to what language it is allied.

The origin of the languages and alphabets of India is a subject upon which various opinions are formed. The antiquity of the Sanskrit has been denied by many philologists, some of whom say both the Sanskrit and Lat alphabets are derived from the Dravidian, as the Aryans brought no alphabet with them.² As far as the rock and Lat inscriptions are con-

¹ D'Alwis on the Origin of the Sinhalese Language, Jour. of the Ceylon branch of the R.A. S. 1865—6, 1870, pp. 143, 150; W. W. Hunter, Aborig. Lang. of India. "Pali has been a dead language for 2000 years." Childers, Dict.

² J. R. A. S., v. 423, new series.

cerned, there can be no doubt the Pali or Lāt alphabet is the oldest, no Sanskrit inscriptions having been found of an anterior date.¹ The Sinhalese consider the Pali more ancient than the Sanskrit, being, according to the “Mahawanso,” the root of all languages.² If the Sanskrit alphabet is older than the Pali it must have existed in some form—as there are no inscriptions, there must have been writings; but then it has been seen the existence of Sanskrit writings as old as the inscriptions of Asoka is very doubtful. Colonel Sykes doubts the antiquity of everything connected with the Brahmins. (*Vide* ch. xxiii.)

Rajendralāla Mittra classes Indian languages in the order of antiquity as follows:—Sanskrit, Gāthā, and Pali, then the Prākṛita, Sauraseni, Drāvedi, and Pūñchāli, which in their turn have changed into the vernaculars of India at the present time. The Gāthā he considers the oldest next to the Sanskrit, and the language of Northern India at the time of Buddha, followed by the Pali or Magadha in the time of Asoka, although some consider Magadha was the language used by Buddha. Nothing more is known until the tenth century, when Hindvī, which bears a close resemblance to the Sanskrit, was the vernacular of the civilized population of India, since then much changed and divided into dialects.³

Dr. Muir thinks the Sanskrit the oldest of the Indian languages. He says, “The Sanskrit, Zend, Greek, and Latin are all as it were sisters, daughters of one mother, who died in giving them birth . . . that all the races of men who spoke these languages are also all descended from one stock separated by migration, their ancestors at a very remote period living in some country out of India, and speaking one language.”⁴ It is rather strange that many Sanskrit words have been found in the Aboriginal language of New Zealand,⁵ and there are, it is said, 839 Sanskrit words in Homer.⁶

¹ J. R. A. S., vi. 419.

² Turnour's Epitome. xxii. Childers, Pali Dict. pref.

³ J. A. S. Beng., 1854, p. 614; 1864, p. 469—490.

⁴ Sanskrit Texts on the population of India, part ii. 275, 1860.

⁵ J. R. A. S., ii. 46.

⁶ Higgins, Anacalypsis, i. 12.

The most puzzling of all to account for are the Dravidian dialects of Southern India, said to be allied to the Tartar and Finnish, but when or how the people speaking them reached India is not known. (*Vide* ch. vii.)

Some suppose the Dravidian dialects to resemble the Australian, but not the Polynesian.¹

ARTS AND SCIENCES.—*Weaving*.—There is little doubt all the scientific knowledge and industrial arts in Ceylon are of Indian origin. The “Mahawanso” (p. 267) mentions that artizans were brought from the Peninsula, along with the Pandyan princess, who was Wijayo’s second wife; however, the inhabitants, when he arrived, appear to have known the art of weaving—for Kuweni is represented as seated at the foot of a tree spinning when he landed and advanced towards her; but this incident may have been introduced into his narrative by Mahanamo to produce a dramatic effect, being quite in character with the primitive simplicity of the times. (p. 48.)

Mention is made in the “Mahawanso” of a white cloth for pilgrims to walk on, seven miles long! (p. 218.)

Asbestos towels were sent by Asoka as a present to the King of Ceylon. They are described as costly hand-towels, cleansed by being passed through a fire (p. 76); also cloth of gold, the kimbaub of India.

Carpets of woollen fabric are mentioned in the second century B.C., evidently of Indian manufacture (p. 169):

“Bleaching and dyeing cloths of every hue is mentioned (A.D.) 161—and a curious custom described (p. 179) of taking cotton from the tree at daybreak, then spinning, weaving, and dyeing yellow, sufficient cloth to make robes for a priest before sunset. “It is said to be still practised in the island, and is a custom identical with that mentioned by Herodotus as observed by priests in Egypt, and not unlike the Scandinavian myth of the twelve weird sisters weaving the crimson web of War between sunrise and sunset,” embodied in an ode among the Orcades of Thormodus Torfæus Hafniæ, translated by Gray in his “Fatal Sisters.”

A very primitive loom is employed in Ceylon for weaving

¹ R. Caldwell, *Drav. Gram.*, p. 53; D’Alwis, *Sidath Sangara*.

cotton cloths : when using it the weaver sits on the ground with his feet in a hole. A considerable quantity of rough unbleached calico and towels are manufactured at Putlam and other places in the North.

FINE ARTS.—Music.—The “Mahawanso” speaks of a harp as early as 157 B.C., and of a procession, “where there was every description of vocal and instrumental music.”¹ If we are to believe this, the art must have sadly declined ; for the music of the Sinhalese of the present day is little more than a succession of nasal whines accompanied by “tom-toming,” or beating of the fingers on a rude drum, and they have a greater love for noise than harmony. Any person who has heard a Hindu mendicant, who performs in the streets of London, will have a very good idea of what their music is. They have also a sort of flageolet, and a primitive two-stringed species of violin, made of a cocoa-nut shell ; but they are rarely seen or used now.

Paintings.—These productions, which are exclusively ecclesiastical subjects on walls of temples, are detestable, hard and dry deformities, copied with a rigid adherence to ancient models, without perspective or any effect of light and shade.

Various wooden articles, such as lances, walking-sticks, and arrow-shafts, are prettily painted with a species of lacker. The colours are mixed with a resin which exudes from the *Aleurites*, or *Croton laccifera*, named Wel-kappiteya by the Sinhalese. After the groundwork, which is usually black, has been painted, a raised network of solid paint is applied ; a bit of the paint is put on the end of a stick and heated, when it is drawn out into a filament, and then placed on the heated surface of the stick, and arranged with a finger-nail, which is allowed to grow long for this purpose. The colours used are black, vermilion, and chrome.

A cement, or paint, made of vermilion mixed with tīla, or tala oil, which is the Sinhalese for sesame, is mentioned B.C. 157, in the “Mahawanso” (p. 169) ; but as sesamum is not a drying oil, there is probably some mistake here—walnut, linseed, and poppy are the only real drying oils ; paints, mixed with

¹ Mahaw., pp. 180, 186.

any other, will not harden. The earliest use of oil as a medium in painting is said to be in the sixth century.¹

Statuary and Carvings.—These are generally monstrous representations of Buddha, always designed in the three orthodox positions—sitting or meditating, standing or preaching, and repose or nirvana. Chinese writers extol as a work of art a statue four feet high, sent from Ceylon to the Emperor Nyan-ti² A.D. 418, which in all probability was a hideous monstrosity. And Fa-hian gives a glowing description of those he saw in Ceylon, which had painted and gilt draperies with costly jewels for ornaments. One is described in the “Mahawanso” A.D. 200, the eyes of which were formed of gems, and the curls of the hair of sapphires and threads of gold.

Images of Buddha are so often designed with African features, woolly hair, and large ears, that Sir W. Jones³ was inclined to believe from this circumstance that he was of African origin. Dr. Davy (p. 231), who also alludes to the fact, thinks it must be either accidental or a fanciful arrangement of the artists, and points out that they would not be likely to take negroes for a model, as the Sinhalese believed tormentors in hell resembled them. Short curly locks of hair on representations of Buddha are found among the sculptures on the Amravati-tope in India,⁴ also on the heads of his attendants, which leads to the supposition that he belonged to some of the hill tribes of Bengal. Rays or glories are described as issuing from his head in the “Lalita Vistara.”

Statues are made of wood, ivory, sandal, clay, chuman, &c. Bronze statues are mentioned in the “Mahawanso” A.D. 459.

The Sinhalese are rather clever in turning and carving ivory, but their productions are very inferior to the Chinese. Linschoten⁵ says, “His master, the Bishop of Goa, had a crucifix in ivory an ell long presented to him by an inhabitant of the island, so neatly wrought and proportioned that it was

¹ Sir C. L. Eastlake, “History of Oil Painting.”

² Ma-touan-lin.

³ Sir W. Jones, Works, i. 12.

⁴ J. Fergusson, F.R.S., on the Sanchi and Amravati-topes, p. 132, ed. 1868.

⁵ Travels, p. 25.

sent to the King of Spain." Elephants' teeth, sawn in slices, are manufactured into snuff-boxes and various fancy articles.

Working in precious Metals.—If we are to believe the "Mahawanso," gold was extensively used in decorations. In the second century ships are described as arriving with it, but they do not say from where.

A golden plough was used for marking out consecrated ground (806 B.C.),¹ and a pair of compasses, made of silver, pointed with gold, to describe a circle of immense size (157 B.C.). About the same period an account is given of a Bo-tree of gold, eighteen cubits high; the roots were made of coral, and the leaves, which were formed of gold, glittered with gems, the trunk was of silver, eighteen inches in circumference (p. 179).

The description of a palace, or monastery, built by Dutagaimunn, in the Maha megho garden at Anuradhapura (161 B.C.) would suit the "Arabian Nights."—"A gilt hall, supported by golden pillars, representing lions and other animals, was festooned with pearls and beads; a throne formed of ivory was surmounted with an emblem of the sun in gold, the moon in silver, and the stars in pearls; from it were suspended bunches of flowers made of gems. A cloth of inestimable value covered the floor. There was an ivory fan of exquisite beauty; a pair of slippers ornamented with beads; a white parasol (an emblem of Royalty), with a silver handle and rows of silver bells; the rice ladles, usually made of coco-nut shells, were of gold" (p. 169).

The "Rajavali" speaks of golden swords, shoes, and bands for the forehead, and the "Rajaratnacari" of the gilding of brass, wood, &c. (p. 60). At the present time gold and silver are worked into jewellery with skill, but the workmen are principally Tamils or Moors, and their tools of the most primitive description.

Copper and Brass—are often mentioned in the annals, and various utensils made from them—lamps, bells, cooking vessels, goblets, and bathing-tubs. According to the "Rajaratnacari," brass vessels for holding priests' food were placed near the

¹ Mahaw., pp. 99, 153, 172.

Bo-treg.¹ Lamps for bazaars, and other small articles, are still cast in the island. Dr. Davy describes an ancient brass lamp which he saw in the temple at Kattregam, constructed on very scientific principles, showing a knowledge of the pressure of the atmosphere.

Pottery.—This, most ancient of arts, has made little progress in the island. A very primitive potter's wheel is still in use, turned by a man, while another moulds the clay. Red-coloured earthenware, called chatties, of a globular form, with a narrow neck and round lip, are universally used for carrying and holding water, and basin-shaped vessels for cooking, which stand the fire admirably. Painted vases are mentioned in the "Mahawanso" at the time of Asoka, but it is not stated whether of foreign or native manufacture.

Coins.—No Sinhalese coins have been found previous to the eleventh century, although the "Mahawanso" (pp. 157, 175) speaks of their being in use in 161 B.C. It describes a gold coin, called "kahapanna," also silver coins, and a gold "massa" worth eightpence; but if gold was as valuable then as now, an eightpenny gold coin would be too small to handle. "Massa" means a kind of bean, and is also a general name for grain or pulse. Golden masha grains were formerly used in trials by ordeal in India; and Marsden says there is a Malay gold coin called massa.

Prinsep, in an article in the "Journal of the Asiatic Society of Bengal, 1837," says, "there are no coins from Ceylon older than a gold one of 1060 A.D. belonging to the Sholean or Malabar dynasty, which would make it in reality an Indian coin. There has been found a gold coin of 1890, with the Nandi or Indian bull delineated on it, and copper coins of the eleventh and twelfth centuries have been dug up. The records of the Ming dynasty (1522) as quoted by Sir E. Tennent, speak of the fine gold coins of Ceylon." But where are they? Since the arrival of the Europeans few countries have been so poor in the precious metals. Betel leaves were a currency in the time of the Portuguese in consequence of the scarcity of even copper coin. Great part of the royal revenue appears to have

¹ Pp. 60, 104; Rajavali, pp. 190, 214.

been always paid in kind; according to Dr. Dwy £1500 was all the specie the last King of Kandy received. The French translator of "Ribeyro" makes him say erroneously "that hook-money was made in the island;" but it was introduced by the Portuguese along with other coin. (*Vide* ch. xiii.)

In the early part of this century larins, or hook-money, were in circulation in the Maldives, no vestige of the currency during the time of the Portuguese now remains. Under the Dutch, the various coins used in Holland were current in Ceylon; but the peculiar coin of the colony was the copper stiver, now called "pice," thirty-six weighing one Dutch pound of copper.

Gold pagodas were coined at Tutocorin, in the Dutch Mint there, and some silver rupees were coined by Falck and Vandergraff.

A variety of foreign coins were also current, as the Spanish dollar and sicca rupee.

In 1785, Vandergraff, finding the treasury in an embarrassed state, introduced a paper currency, the first ever known in the island, consisting of notes payable in copper stivers, at the rate of 48 for each rix-dollar, which was divided into 12 fanams ($1\frac{1}{2}d.$ English), and each fanam into 4 stivers. In 1787 Vandergraff coined stivers from old brass guns instead of copper.

When the English obtained possession of the island, the depreciated copper coin and paper-money formed the chief currency. One of their first measures was the withdrawal of the latter, and the issue of a new copper coinage with treasury bills. But for many years money matters were in a bad state, silver and copper coin disappearing from unfavourable exchanges, notwithstanding that the currency was much alloyed.

At present, in addition to English coin, rupees, and rix-dollars, worth 1s. 6d., are in circulation. The copper coins are chillies, pice, and fanams= $1\frac{1}{2}d.$, 3 chillies=1 pice, 4 pice=1 fanam.

Various Arts.—Shops and bazaars are mentioned at Anuradhapura where aromatic drugs were sold 204 B.C.;¹ leather, perfumes, and camphor oil, 161 B.C.; spices and scented oils,

¹ Mahaw. pp. 139, 180, 208.

259 B.C.; a delicious fragrant cement made of jessamine flowers, 157 B.C.; sweet spices, and a sugar-mill, 76 B.C.; also lamp-wicks made of silk, 19 B.C.¹

We may infer from the number of perfumes and essential oils mentioned in the chronicles that they must have had some knowledge of distillation at a very early period, although it is generally supposed to be a comparatively modern invention of the Arabians.

It is not quite clear if the intoxicating liquids denounced by Buddha meant pure alcohol or liquids resembling beer, which Herodotus says was known to the Egyptians. A Sinhalese king, Sena IV., who reigned 1018 A.D., is stated in Turnour's "Epitome" to have died a victim to ardent spirits, and the liquor described by Abu Zaid as being made from the palms was probably arrack. (*Vide* ch. xi.) Dr. Ure (*Dict. of Arts*, 1-42), says, "the period when fermented liquids were first submitted to distillation, so as to obtain ardent spirits, is shrouded in much mystery." The only chemical operation of the modern Sinhalese is distillation performed with very rude implements; their still being of earthenware joined to the refrigerator by a piece of bamboo pipe; the refrigerator is a common chattie floating in a larger one containing cold water.

Sandal makers, potters, blacksmiths, carpenters, stone-cutters, goldsmiths, and makers of water-strainers for priests, are alluded to A.D. 262.² Devotees among the Buddhists strain the water they drink for fear of killing animalcules.

A very good hone is made of corundum and kappiteya resin, melted together and poured into a mould.

Domestic Furniture.—Beds and chairs are mentioned 204 B.C. The modern Sinhalese are very good carpenters, making beautiful furniture from the numerous and valuable woods of their island²—such as ebony, calamander, satin, and jak. Some of the articles are elaborately carved and expensive; jak wood is the commonest of all, and is of a yellow colour when first made up, but deepens in shade with age, becoming something like mahogany. Furniture is usually hawked about for sale, or ordered from the carpenters. They make almost as much

¹ Mahaw., pp. 124, 212.

² Mahaw., pp. 152, 231.

use of their toes and feet as their hands, being in common with the Hindus almost quadrumanous, picking up things off the ground with their toes as often as with their hands.

Instead of sand-paper for polishing wood they use the rough leaves of one of the *Dilleniaceæ* (*D. sarmentosa*), which they name "korasawel."

Mirrors of glittering glass are described as being carried in a procession (806 B.C.).¹ Does this mean they knew the art of silvering glass? Another puzzling statement is, "windows, with ornaments like jewels, which were as bright as eyes;" festoons of beads like gems mean evidently glass beads.²

The invention of glass, as everybody knows, has been attributed to the Phœnicians. Mr. Smith, of the British Museum, says "The manufacture was known to the Assyrians." It is also one of the most ancient of Indian arts (Pliny, xxvi. 26). The Hindus have been long aware that this substance is a non-conductor of electricity, and placed lumps of it on the tops of their temples, as a protection against lightning. Admiral Fitzroy, in his "Weather Book" (p. 441), suggests that its use in English light-houses, at a comparatively recent period, with a similar object, was derived from the East. "In Japan, China, Siam, Ceylon, and other Eastern countries, a system has prevailed from time immemorial of placing lumps of glass on the pinnacles, or other high points of buildings, to avert lightning. Some British light-houses had averters even in this century, doubtless suggested by captains of East-Indiamen." The "Mahawanso" (A.D. 241) gives an obscure description of a contrivance attached to the pinnacle of a building to avert lightning, but it is doubtful if the word "*Vajira*," rendered glass by Turnour, meant this substance or rather an adamant, a loadstone, or an iron magnet. It says, "Having placed a large gem on the top, he fixed below it, for the purpose of averting lightning, a *Vajira chumbata*, like a ring."³ Chumbata means to kiss, also a kisser of steel.

¹ Mahaw., pp. 103, 99.

² Mahaw., pp. 103, 163.

³ P. 229; D'Alwis, Catalogue, p. 118; Tennent, Ceylon, i. 509. (*Vide* ch. viii.)

Iron.—Plates of iron and brass, four inches thick, and iron gates for a town, are mentioned B.C. 168; also iron ladders. The iron ore of Ceylon, which is of very fine quality, is smelted in small quantities, after a very primitive fashion, in a clay furnace or hole in the earth, with charcoal; a pair of bellows, made of bullock's hide, and having a wooden pipe, being used to blow the fire. When the iron is produced, it is converted into steel by enclosing a small portion, covered with wedges of green wood, in a clay cylinder, about one foot long and two inches diameter, the ends being closed with clay. It is then placed in a furnace for several hours. The cylinder when taken out is usually quite vitrified. The little pieces of steel thus produced are not much thicker than a man's finger, but of very fine quality. Edrisi, and other ancient Arabian writers, speak highly of Ceylon steel.¹

This mode of making iron and steel is practised in India. Dr. Royle says, "They use the wood of the *Convolvulus laurifolia*, *Cassia auriculata*, and some leaves of the *Alsophila gigantea*, or tree-fern, to furnish carbon in making steel, luting the iron up in a clay cylinder, when the hydrogen gas from the wood and leaves combines with the iron, and makes steel in two hours and a half, less time than in England, where it takes four."²

The Bessemer process, invented since Dr. Royle wrote, has much facilitated and altered the manner of making steel in England.

Medicine.—Sinhalese medicine is derived from the Hindus, which Dr. Royle says is more ancient than the Greek. Their medicinal preparations are chiefly compounds of herbs, of which an immense number are employed,³ and they are not unacquainted with the use of minerals, particularly mercury, and boast of being able to prepare it better than Europeans, having a secret which renders it less injurious, but they often only mix it with fat. Marco Polo mentions that the Brahmins in his time had some secret way of preparing it, and they profess that

¹ *Vide* chapter on Minerals.

² Dr. Royle, "Arts and Manufactures of India," ed. 1851.

³ *Vide* chapters on Botany.

when taken in small doses monthly along with sulphur it renews youth. They believe that sulphur and mercury, mixed in various proportions, are the base of all metals.¹ Mercury was used by Mesue, the Arabian physician, for the cure of skin-diseases, 800 years since. Pliny (xxxiii. 8) thought it was a poison.

The Homœopathic system of medicine, a supposed modern invention of the Germans, has been known and acted upon from the earliest period, both in India and Ceylon. Vegetable and mineral poisons are frequently administered in small doses, such as nux-vomica, one of the passion-worts, *Modecca palmata*; arsenic, in a white powder; copper, gold and silver in powder. Pearls in powder are used as a tonic, and for weak eyes.

Dr. Davy says, as they have a horror of dead bodies, and object to dissections, they know nothing of anatomy; but practise cupping and bleeding, and amputate with a knife heated to a dull red—a method formerly practised in Europe.

Peacock flesh, among the Hindus, is considered a remedy for contraction of the joints.

Bezoar stones, a smooth, glossy, dark-green concretion, found in the stomachs and gall-bladders of animals, commonly in monkeys, are in great repute all over India and Ceylon as an antidote to poison.

A Sinhalese king (A.D. 339), named Budadaso, is represented to have been a skilful doctor, practising on animals as well as man; but the accounts are rather fabulous. Among the strange cures effected by him was that of a cobra, by an operation on its intestines. He also fished up a snake from the stomach of a man who had swallowed the spawn in drinking water; and cured a horse by bleeding, and a priest of ascrides by giving him some of the blood.²

A clay of a red colour, called arua, is mentioned, but it is not known what it was.

A long list of Sinhalese medical works, mostly in Sanskrit

¹ Col. Yule's Polo; Ainslie, Mat. Med. of Hind.; Royle, Antiqu. of Hindu Med.

² Mahaw., p. 244. The snake was probably an Enteeoon.

and translations from it, is given in Ainslie, "Mat. Med. of Hindustan."¹

This brief sketch of native medicine applies more to that practised among them formerly than at present, as it is being modified by the adoption of European methods. Many of the Buddhist priests are also doctors.

Astronomy was limited to the calculation of horoscopes, astrologers being found in every village. The Florence map speaks of a town inhabited by astrologers, situated on a lake in the centre of the island,² which was of course imaginary. It is also alluded to by Di Conti. (*Vide* ch. xii.)

Aryabhatta, a Hindu astrologer of the fifth century A.D., propounded the true cause of lunar and solar eclipses, and the diurnal revolution of the earth.³

The "Suriya," one of the Siddhantas, supposed to have been written in the fifth or sixth century A.D., contains trigonometrical theorems, only known in Europe in the sixteenth century;⁴ but the Hindus are backward in geometry, being chiefly practical in laying out rice-fields, and works of irrigation.

Architecture.—An enormous quantity of architectural ruins are found in Ceylon, principally at Anuradhapura and the north-western province. Forbes speaks of ruined dagobas, pillars, and blocks of granite, at Mahagam, in the south, which have attracted little attention, and are not alluded to in the "Mahawanso." According to Ptolemy, Mahagam was the capital in his time (A.D. 139).

As far as we can discern from the remains of these ancient buildings, they were more remarkable for size and extent than elegance of design, and the private dwellings of towns in the interior must have been wretched, if we are to judge from those of Kandy in 1815.

The maritime towns have all been erected by foreigners—Tamils, Moors, Portuguese, or Dutch.

Dagobas.—The most remarkable of the ancient buildings are the dagodas, a species of shrine, the name being derived from

¹ Vol. ii. 525.

² Santarem, iii. 336.

³ Colebrooke's Essays.

⁴ Tennent.

"Datu,"¹ a relic, and appear to have been built for the purpose of enclosing fragments of Buddha's bones. That these buildings are merely shrines, is shown by the interior of some of the ruined ones which have been examined, where, in a small hollow space in the centre, has been found enclosed an earthen or stone vessel, containing bits of bones, &c. In the dagoba opened near Colombo, by Mr. Layard, there were some fragments of bones, enclosed in thin gold leaf; a few pearls; and a clay cobra, wrapped up in cotton cloth; also a brass lamp; a small pyramid made of cement; gold rings, and bits of glass, all similar to the things found in one opened at Benares.² A stone casket was found in the interior of the Amravati tope, containing a pearl and a bit of gold leaf.³

The discovery of a clay cobra in the dagoba at Colombo, which is said to have been built in honour of Sakya's conversion of the Nága King of Kalany, is a curious proof of snake worship.

Dagobas have nearly all the same form, only varying in size, being solid hemispherical masses of masonry, standing on a raised square platform, approached by steps, and surmounted by a pinnacle. They are surrounded at some distance by a number of stone pillars, arranged in circular rows, some having four of them. Many surmises have been made as to the object or use of these pillars; but are not the dagobas and the surrounding pillars symbolical representations of Mount Meru, and the encircling ranges of mountains?⁴ Their arrangement bear a remarkable resemblance to the circles of stone at Stonehenge, generally attributed to the Druids, although some suppose Stonehenge was a "Boodh temple."⁵ The tumuli at Ashdon, in Essex, in which bones, bits of glass, and coins have been found, are also not unlike dagobas.

Many of the Ceylon dagobas are of immense size,⁶ three of

¹ Wilson, *Asiat. Res.*, xvii. 605.

² *Asiat. Res.*, v. 131.

³ Fergusson, p. 164; Turnour's "Epitome," p. 15.

⁴ *Vide Buddhist Cosmo.*, ch. i.

⁵ *Asiat. Res.*, ii. 488.

⁶ There are some discrepancies in the heights assigned to these dagobas; according to native accounts in Turnour's *Epitome*, the highest of all was the Abhaya-

them still remaining at Anuradhapura, being the largest known in any country. Abhayagiri dagoba, built by King Walagambahu, on his restoration to his throne (88 B.C.), is said to be 244 feet high in its present condition, having a radius of 180 feet at the base, and a spire 64 feet high; while Jaytawana (erected A.D. 275,) is 249 feet including the spire and base, with a radius of 180 feet. The platforms on which they stand are about 500 feet square, and from 5 to 9 feet high. Neither of these dagobas is considered to be a shrine, but a commemorative monument; and when new, and coated with white chunam, must have presented a very grand and imposing appearance.

All these buildings are now in various stages of decay, most of them being covered with trees and shrubs, which have taken root in the crevices. Some are decaying more rapidly than others; the Ruwanwella dagoba at Anuradhapura, (built B.C. 157,) was 189 feet high in 1830, and only 140 feet in 1846. According to the "Mahawanso," it was originally 270 feet high (p. 161). The best preserved of all are the Lankarama, which was repaired in the last century, and the Thuparama, built by King Tissa about 250 B.C., to enclose a collar-bone of Buddha, and is probably older than any building of the kind in India. This dagoba, which is bell-shaped, is only 60 feet high, and was surrounded originally by 184 stone pillars,

giri, being when new 180 cubits or 405 feet; Lieut. Skinner in 1830 made it only 230 feet, and the Jaytawana 269, while according to native accounts it was 140 cubits or 315 feet. The greatest height assigned in the "Mahawanso" to any of them is 120 cubits, and that only in describing the Ruwanwella or "Mahathupa," pp. 9, 161, from which it may be inferred it was the largest in the island, 120 cubits of 2 feet 3 inches makes 270 feet. The "Mahawanso" does not give the dimensions of either the other two large ones, the heights given in Turnour's "Epitome" from other native sources being less reliable. It is quite certain from the radius being only 180 feet, and the hemispherical shape, that none could have been much more than 270 feet including the basement and spire, the latter not being lofty. Sir E. Tennent says, i. 346, "assuming Abhayagiri to have been 405 feet high, that was 50 feet higher than St. Paul's, and 50 lower than St. Peter's," but this is erroneous as far as St. Paul's is concerned, which is stated in Blackie's Gazetteer to be 404 feet to the top of the cross, and in MacCullagh 370 feet. A second account of Anuradhapura and its dagobas, with a plan and diagrams by Captain Chapman, R.A., will be found in J. R. A. S. xiii.; also a drawing of the hill temple of Mihintale.

26 feet high, more than a hundred of them still standing. The pillars are formed of two pieces of hewn stone, one forming an octagonal shaft, 23 feet 6 inches long, 9 feet of the lower part being square; the other, a carved capital 2 feet 6 inches long. The Rankot dagoba differs from most of them, in having eight small shrines surrounding it instead of pillars.

The dagobas are constructed of the same materials as Indian topes, the interior being made of mud and sun-dried clay, and covered with burnt or sun-dried bricks, afterwards coated with mortar and chunam.

Some of them appear to have been enlarged at different periods. The dagoba at Bintenne, enclosing Buddha's thorax-bone, when first erected was only 12 cubits high, subsequently enclosed in another 30 cubits high, and again made 80 cubits high, 164 B.C.¹

The "Mahawanso" (ch. xxix.) describes the foundations of the dagobas as being first well trampled by elephants with leather boots on their feet; then successive layers of brass and iron plates and stones were placed, on which the super-structure was raised.² There is probably some mistake here with reference to the iron and brass plates, their employment being very dubious.

The erection of these religious monuments was accompanied by great ceremonies and influx of priests from all parts. "Mahawanso" tells us hundreds of thousands of priests from upper India attended the erection of the great tope (Mahathupa³) Ruwanwelle (157 B.C.). The term "Mahathupa" implies that this one was the largest in the island, which seems to have been overlooked by several writers.

None of the Indian topes appear to be more than half the size of the largest in Ceylon, but the design and execution are finer, particularly that at Manikyala. Dagobas are not unknown in the western world; one has been found forty miles from Algiers, 166 feet in diameter, which is called the tomb of the Christian lady Kubr-Roumia; and similar mounds exist in

¹ Maha., p. 4.

² Maha., p. 171.

³ Maha., p. 162.

⁴ Maha., p. 165.

Mexico. It is now said, that America was discovered by Chinese Buddhists in the sixth century.¹

Monasteries.—All that now remains of a building called the Brazen Palace in the “Mahawanso,” from its being covered with brass tiles, erected 161 B.C., are 1600 stone pillars, about 12 feet high, arranged in parallel rows, and covering a square of 225 feet. At first sight it appears difficult to understand how it could have been a monastery, or any kind of habitation, as the pillars are only about six feet apart; but it is suggested they supported a wooden platform, on which the building—said to have been originally nine stories high—was erected, each story decreasing in size, a similar arrangement being adopted in modern Burmese monasteries, and in Hindu temples at Madura and other places.²

Priests’ houses were originally, in compliance with the orders of Sakya, little more than sheds, made of reeds or mud, but when they came to be patronised by kings, this stern simplicity was laid aside, and they were housed in buildings like the Brazen Monastery, containing 1000 rooms. It appears to have been several times destroyed and rebuilt, one of the last occasions being in the reign of *Maha Sen* (A.D. 275).³ According to Turnour’s “Epitome,” except the pillars it was all made of wood, and 120 cubits high.

The Brazen Monastery, or more properly the “Lowa-Maya-paya,” was not the only monastery in the island, but all traces of the others have disappeared.

A very remarkable building at Polanarrua, called the Sat-Mahal-prasada, is, according to Mr. Fergusson, a perfect representation of the seven-storied temples of Assyria, “a lineal descendant of the Birs-Nimroud;”⁴ but it never could have been a residence, which is apparent on looking at it. It was probably erected in the twelfth century A.D.

Colonel Yule suggests what is exceedingly probable, that the

¹ *Vide* Leland’s *Fusang*.

² Fergusson, “Handbook of Architecture”, ed. 1865. Capt. Chapman’s Trans., R. A. S. iii.

³ *Maha.*, p. 285.

⁴ Vol. i. 136; iii.

many storied monasteries of Ceylon and other Buddhist countries, in which the flights decrease in size as they ascend, are symbolical representations of Mount Meru. According to the "Mahawanso" (p. 164), the sanctity of the inmates corresponded with the part they occupied in the building, the most holy living in the highest flight, and the least so in the lowest. The upper story being very much smaller than those below, showed how few there were among the community who could attain to this supreme and elevated sanctity.

There is a very remarkable five-storied Buddhist monastery at Mahavellipore, south of Madras.

Palaces.—There are only the remains of one ancient royal palace to be found, that at Polanarrua, which is a brick-built building of only one story, and not very remarkable for its architecture. The "Mahawanso"¹ describes either a palace or a monastery seven stories high, containing 4000 rooms, and hundreds of stone pillars in the same town, whose site appears to be indicated by some prostrate pillars near the Sat-Mahal-prasada.

Among the ruins at Polanarrua is a great brick-built temple, Jata-wana-raina, constructed in the reign of Prakrama Iñāhu (1153), and the Dalada-Malegawa, or palace of the tooth, a square building built of cut stone;² also a curious circular edifice, about 20 feet high, approached on four sides by steps and gates with pillars on each side.

The ruins at Polanarrua are comparatively modern, not having become the capital until 729 A.D.; Anuradhapura being then deserted, on account of the incursions of the Malabars. Both cities have been for centuries overgrown with jungle, but the buildings appear to have been spared by the invaders; time and the luxuriant vegetation of the tropics alone injuring them. "Anuradhapura is the only ancient Buddhist city that contains something like a complete series of former grandeur,³ in seven topes, one monastery, a building surrounding the Bo-tree, and other ruins." In India, Buddhist monuments are few, and only to be found in isolated positions.

¹ Ch. lxxii.

² Turnour's Epitome.

³ Fergusson, p. 506.

Materials used in Architecture.—Sun-dried bricks appear to have been the chief material anciently employed. Burnt bricks were sparingly used, and stone was reserved for pillars, sculpture, and steps. Pillars were nearly all square or octagonal. Large stones were quarried by splitting. Wooden wedges were driven into holes, after which water was poured on them, when the swelling of the wedges burst the stone asunder. This system, known in Ceylon 2000 years ago, was only introduced into England in the beginning of this century.¹

Some very large monoliths appear to have been conveyed several miles to their destination. There is a stone trough for elephants to drink from, ten feet long and five feet broad, hollowed out to a depth of two feet, at Anuradhapura; and a flat dressed slab at Polanarrua, twenty-six feet long, four feet broad, and two feet deep, bearing an inscription² relating to the reign of Kirti-Nissanga (A.D. 1187).

A material called "cloud-stone" is several times mentioned in the Chronicles, and supposed to be a kind of fluor marble, like that of Tabriz, and must have been imported.³

The habit of mixing coco-nut water and the gum of the *Ægle Marmelos* with lime and cements to increase their adhesive quality is mentioned in the second century B.C. Knox says they mixed the water in which grain had been boiled, or milk, with lime. The practice of mixing some vegetable liquid with it has also prevailed in India from the earliest times.

The arch appears to have been unknown, unless when employed over doorways in more recent buildings. Their bridges were beams of wood laid on rude stone pillars. There was an ancient bridge twelve miles from Dambool made of blocks of granite, eight feet high, supporting horizontal slabs, seven feet long, four feet broad, and one foot thick.⁴

Carvings of various animals are seen on the stone ruins of Anuradhapura and Polanarrua; also a bird resembling a goose, which is a common ornament on Buddhist buildings, this bird being a great favourite with these religionists. In one of the Buddha legends his hair is described as resembling the Kala-

¹ Trans. R. A. S., iii. 470; Davy, p. 73.

² Turnour, p. 90.

³ Upham.

⁴ J. A. S. Beng., 1847, p. 350.

hanza. The goose is also depicted on the Burmese standard, and there are many anecdotes about the bird in the "Ramayana."

Another ornament found in the same places is the honeysuckle, a very ancient and widely diffused ornamentation in architectural carvings, being found among the Greeks, in Assyria, and in India, on buildings in the time of Asoka.

There are no tall pillars, or "lats," in Ceylon like those of Delhi and Allahabad, or the curious pillar-like temple at Boodh-Gayá.¹

¹ Fergusson.

CHAPTER XXIII.

BUDDHISM.

Buddhism.—There is no doubt Buddhism is a very remarkable religious system, and one which counts more votaries at the present time than any other in the world.¹ Although driven from the Peninsula many centuries ago, it still maintains its ground in Nepal and Thibet, is more or less vigorous in Ceylon, and dominates in Burmah, Siam, Cochin China, Japan, and throughout the greater part of the dense population of China, and is also found in Tartary and Mongolia. Without possessing the persecuting and fanatical zeal of the Mahometans, Brahmins, and other sects, the Buddhists have shown themselves capable of a great deal of enthusiasm and self-imposed hardships in furtherance of their cause.

It would be beyond the scope of this work to give anything more than a mere sketch of Buddha and his religion, a subject which Max Müller has declared to be almost beyond the power of a single individual to study comprehensively. It would be indeed an immense task to clear away the haze and romance thrown around this mysterious personage by his followers, which still shrouds the reality from our view, to ascertain what were the real doctrines preached by Sakya Muni, which the myths,—which the truth.

Buddhism was comparatively unknown until 1824, when Mr. Hodgson, Political Resident at Nepal, published his account taken from old MSS. which he found there.² Since then, a crowd of savans, learned in Oriental languages, have

¹ The Buddhist populations of the East have been estimated at 369,000,000.

² J. R. A. S., ii. p. 233.

produced numerous works on the subject, which are annually increasing. Among the most important essays are Laidley's "Notes to Fa-Hian," Barthélemy Saint Hilaire's "Le Bouddha," Paris, 1860, and Burnouf's "Histoire du Bouddhisme," 1844, also his "Lotus de la Bonne Loi," 1852. Much information will be obtained in Beal's "Notes to Fa-Hian," who recounts many fabulous legends of Buddha current in the fourth century A.D.

Buddha presents the strange spectacle of a young and handsome prince reared in the lap of luxury, whose career, we are told, opened with all the glow and splendour of an Eastern morning, voluntarily abandoning his luxurious home with all its seductions—wife, parents, and friends—to become a wandering mendicant preacher; to die an aged recluse at the foot of a Sal tree through a misguided and self-deluding enthusiasm and vain attempt to alleviate the miseries of mankind, of which he seems to have taken an exaggerated view. He wanted the light of "revelation," which can alone illumine the path of such seekers, and for which he sought in vain.

Buddha appears, as far as we can judge, to have had by nature a disposition full of melancholy, an imagination that continually presented sad thoughts even in the midst of the pleasures of a young Indian prince, and threw the dark shadow of the future over the gayest illusions of the present; from the moment that his vision was startled by the appearance of the aged man tottering to the grave, the sad image of decrepitude and death ran across and mingled itself with the most smiling scenes through which his position and career of enjoyment led him, heightened by a belief in transmigration, presenting an almost endless circle of similar existence in some form or other. Thus shut out by his creed from much hope of a blessed futurity—in vain did he pursue his accustomed amusements, their zest was gone for ever, and every moment seemed an hour, until he took some step to seek a release from such misery.

Ten commandments of the highest order of morality are attributed to Buddha: "Kill no living creature; do not steal; tell no lies; do not commit adultery," &c. His precepts con-

tain virtues and moral teachings unknown in any other heathen system of religion. Taken in one sense, he taught that there was nothing but sorrow and vexation in the world, proceeding from the unbridled passions and vain desires of man, which should be ruthlessly rooted out from the human breast, felicity being only obtainable by practising virtue, and keeping the passions in subjection. His reputed doctrines are pithily summed up in a legendary correspondence¹ with a young princess of Ceylon, named Ratnavali, who, hearing of him from some Indian merchants who frequented the island, wrote to Buddha, to inquire how happiness was to be obtained, and received the laconic reply,—“No vice to be committed, practise virtue, subdue your thoughts.” Barthélemy Saint Hilaire says of Sakya; “Je n’hésite pas à ajouter que sauf le Christ tout seul, il n’est point parmi les fondateurs de religion de figure plus pur ni plus touchante que celle du Bouddha.”²

Many of the metaphysical sophistries attributed to Sakya by his followers are beyond our comprehension; but, as far as we can make out, deeply imbued with the dogma of metempsychosis: he regarded life as a curse, an intolerable burthen; and, in his morbid imagination, fancied he had discovered a way of ending sentient existence in the *Nirvana*; that as human existence and its consequent miseries originated in the love of earthly pleasures, by freeing the soul from all these attachments it would at last die out (as it were) and be extinguished at death for ever.

This singular delusion is evidently a modification of the Brahminical dogma of the origin of the human soul—an emanation from Brahma, that has wandered from its original abode of purity and bliss to this world, where, immersed in the fatal pleasures of earth, it has lost its celestial nature and unable to return to its former home till purified by a long series of transmigrations, lengthened in proportion to its guilt.

The Hindus from time immemorial have been addicted to religious suicide, in the hope of getting a step nearer to Brahma; but this sort of suicide formed no part of Sakya’s doc-

¹ *C’oma de Kōrōs’ Trans. Tibetan MS., J. A. S. Beng., 1834, p. 61.*

² *Le Bouddha, pref., p. v.*

trine ; to destroy the body before it had been purified from the dross of earth, entailed another birth. His idea seems to have been annihilation at the natural death through the practice of virtue. Some have supposed Sakya did not believe man had a soul ; but this seems inconsistent with his inculcation of self-denial and purification. Unlike most teachers of Atheism, who centre all their wisdom in the full enjoyment of the present, Sakya rejected the pleasures of this life as unworthy of consideration ; yet his system resembles that of Epicurus, who, while he taught that pleasure is the only deity, also inculcated that virtue was the only pleasure.

In a discourse¹ famous among Buddhists, delivered at Benares when he commenced his mission, which is considered by some to give a clearer idea of his real doctrine than any of his after “*Sûtras*,” he propounded four truths as the essence of his system, which lead to “*Nirvana*.” “There is nothing but misery, the passions are the cause ; destroy the passions and you destroy the misery—labour to accomplish it.” These four points are named “The Wheel of the Law,” because they set the new doctrine in motion. This dogma bears some resemblance to the celebrated lines in Virgil, quoted by Dr. Mill² who remarks that what was a mere figure of speech in the Roman poet has become a religion in the East—

“Felix, qui potuit rerum cognoscere causas,

Atque metûs omnes, et inexorabile fatum subjecit pedibus,” *Geor.* ii. 490.

Buddhism, notwithstanding its moral precepts, its mild and benevolent doctrines, has done little to elevate the condition of mankind or improve the morality of man ; its cold philosophy and metaphysical abstractions offer no help to man in the struggle with his turbulent passions, or consolation in adversity, which a bright hope beyond our vale of tears and thorns can alone bestow. It has nothing better to offer in this world

¹ “The Dharma Cakra Pravartanum sūtra.” The Jour. Asiat. for 1870, p. 346, contains an analysis by M. Feer of the northern and southern versions, *i.e.*, India and Ceylon, of this discourse which differ materially. In a Thibetan version translated by Körös, *Asiat. Res.*, xx., the four truths are said to be, “there is nothing but sorrow in life, it will be so with every birth, but it may be stopped, the way to end it.” An essay on this subject will be found in Burnouf’s *Lotus*, p. 519.

² J. A. S. Beng., iv. 215, the Dr. omitted the reference.

than a cheerless, self-denying cynicism—its heaven a hideous phantom ; all that is bright and loving on earth vanishing for ever in the dismal abyss of annihilation.

Buddhists believe that from time to time since the creation of the world there have appeared Prophets or "*Buddhas*," a Sanskrit word, meaning wisdom, intellect enlightened, men of superior intelligence, acquired in passing through numerous transmigrations, each birth giving them an increased degree of merit, till, in their last birth as men, by perseverance in virtue and meditation they attain perfect knowledge, and proclaim it for the spiritual welfare and enlightenment of mankind ; at their death, instead of assuming a new form they are absorbed into "*Nirvana*." Twenty-five Buddhas have thus appeared ; four during the last "*kalpas*"—immensely long epochs, when at the end of each the earth undergoes a revolution on its surface which changes the face of nature ; and of these there have been thirteen. As truth is eternal, the last Buddha only preached what his predecessors had taught, and one more "*Maitreya*" is to appear before the end of all sublunary things. A Sinhalese work, called the "*Buddhawansa*," translated by Turnour,¹ gives a fabulous account of the previous Buddhas, carrying one back to an incredibly remote period when the first appeared ; but there is nothing of the least interest connected with any of them.

Several accounts of the life of Sakya have been written by his followers, such as the "*Lotus de la Bonne Loi*," part of the Buddhist canon, which has been translated by Burnouf, and the popular Thibetan "*Lalita Vistara*," supposed to have been composed about the Christian era, as there is a Chinese version of it dated 76 A.D.—it was published in Sanskrit at Calcutta in 1853, by Babu Rajendralála Mitra. The "*Lalita Vistara*," whose author is unknown, appears to be the foundation of all the biographies of Buddha, but ends its account at the commencement of his mission in the city of Benares.

In accordance with the belief in metempsychosis, Buddha is described as having, "after an infinite number of births," obtained "*Bodhisattó*," an inferior species of sanctity in Tusita ; but one more birth being necessary for a perfect Buddha, after

¹ J. A. S. Beng., 1838, v., vii. 789 ; Armour, Ceylon Almanack, 1835—6.

appointing Matreya as his Vice-Regent, he became again incarnate as the son of Suddhodhana, Prince of Kapila-Vastu, an unknown locality, probably near Oudh, receiving at his birth the name of Sinha Siddhárta; the terms Sakya, Muni, Gautama, being surnames or family names. His mother, Maya, who was renowned for her beauty, was warned in a dream by a white elephant, of the great dignity that awaited her; the high destiny of her son was also foretold as well as the occasions that would cause him to adopt the ascetic life. To keep these from his knowledge, his father caused three palaces to be built, within the limits of which the prince should pass the three seasons of the year, whilst guards were placed to bar the approach of the dreaded objects; but these precautions were defeated by the power of the "Devas" and inevitable destiny. When the prince was sixteen, he was married to the beautiful daughter of the King of Koli, and 40,000 other princesses also became the inmates of his harem. Whilst living in the full enjoyment of every kind of pleasure, Siddhárta, one day while driving in his chariot to which four white horses were yoked, perceived on the roadside a decrepit old man with grey hair and broken teeth, whose bending form and trembling limbs were supported by a staff; the prince surprised, inquired what the strange figure was, and was informed it was an old man; he then asked if the man was born so, and the charioteer answered that he was not, as he was once young like themselves. "Are there many such beings in the world?" "Your Highness, there are many." The prince again inquired, "Shall I become thus old?" and he was told it was a state to which all beings must arrive. The prince on his return home informed his father he intended to become an ascetic, seeing how undesirable is life tending to such decay. His father conjured him to put away such thoughts, and to enjoy himself with his princesses; and he strengthened the guards about the palace. Four months later a similar circumstance occurred, when the prince saw a leper; and again four months after, a dead body in corruption; lastly, he saw a religious recluse radiant with peace and tranquillity. Resolving to delay no longer, one night, after taking a longing look at his sleeping wife,

Yasódarā, and the son just born to him, he left his palace stealthily, mounted his swiftest steed, and through the connivance of a trusty servant passing the sentinels at the gates, was soon carried beyond the reach of his home and its temptations, which might have caused him to falter in his determination. Reining in his exhausted steed, after galloping all night, Sakya induced a peasant he met on the road to change his humble garb for the courtly dress he wore, cut off his flowing hair, and proceeded to a town, supposed to be the modern Gandara, near Patna, where he offered himself as a disciple of a Brahmin teacher, named Arata Kalama, into whose school the modest and handsome young prince was willingly received, his appearance captivating both the master and his numerous pupils.¹

He soon discovered that they could not put him in the way of the happiness he was in search of, which he began to perceive was only to be obtained by poverty and restraint on the passions, and informing them so, he quitted the town and proceeded to Magadha, where, as his reputation for wisdom acquired in the school of the Brahmin, and reports of his beauty had preceded him, he was received with enthusiasm by the populace, and entered the town in triumph. The King, Bimbésára, perceiving the cortege from the windows of his palace, invited the young apostle to stay with him, and was much impressed with his doctrines; after remaining a short time, fearing the seductions of the palace, he left Magadha and became the disciple of another Brahmin renowned for his wisdom, whom he also left dissatisfied, accompanied by five of the Brahmin's disciples, who followed him in preference to their old master, and retired along with them to Uruwella, a lonely hamlet in the forest, where he spent six years practising the severest austerities; but finding at the end of that time the object of his pursuit still unattained, and his frame exhausted by long abstinence, he partook of substantial food brought to him by a peasant girl, and was abandoned by his five disciples, who were scandalised at this weakness.² Thus deserted and left to

¹ In some accounts he is represented as having sent back his horse and charioteer who went with him thus far. — Beal's *Fa-Hian*, p. 92.

² *Asiat. Res.*, xx. 51, 301.

himself, he fell into a long series of meditations and reveries, during which he imagined he at last discovered the great secret he was in search of, which conferred happiness, led to Nirvana, and the extinction of transmigratory misery. During one of these illusions which lasted a week, while reposing under the famous tree at Boodh Gayá, he received the Buddhahood, or mission of enlightenment to mankind. After debating for some time whether he should disclose the knowledge he thus became possessed of, he proceeded to Benares and proclaimed his mission, or "set the wheel of the law in motion," as his followers metaphorically express it, being then thirty-six years old.

After preaching his doctrines in various places for forty-six years (*vide* ch. vii.), Sakya died at eighty years of age under the Sal trees (*Dipterocarpus*), at Kusinaria, a doubtful locality, supposed to be the modern Hurdwar or Kusia in Gorakpur, in the year B.C. 543, having been born, according to Sinhalese accounts, B.C. 624. The Chinese and Tartars say B.C. 1059. The Parinibbhanan Sûtra mentions that Ananda, one of his disciples, related at the first "convocation," that he heard Sakya died from eating pork at a repast to which he was invited by Chanda, a goldsmith, which he ate on purpose, knowing it would cause his death; others say the pork was poisoned by Mára out of spite—these statements are only found in the Ceylon and Siamese versions.¹

Such is the story of Buddha as given by his followers, which obviously contains a great deal of the fiction and absurdity inseparable from all Oriental accounts of events. Doubts have been expressed whether such a person as Sakya ever existed. The Rev. Spence Hardy, in his "Legends of the Buddhists,"² says, "In the preceding pages I have spoken of Buddha as a real person. . . . I have used the language of the Buddhists, not that of my own conviction. I will not say that I think such a person as Sakya never existed; but I affirm, we cannot know anything about him with certainty, and that it is impossible to separate the truth from the myth." Professor

¹ J. A. S. Beng., 1838, vii. 1003; *Idem*, Col. Low, 1848—72.

² Page 138—187, ed. 1866.

H. H. Wilson, in his "Essay on Buddhism," in the J. R. A. S., considers it probable that Sakya Muni was an unreal being, while Kapila Vastu, the state ruled by his father, has not yet been identified; "neither has the age in which he lived been satisfactorily determined." Max Müller¹ has pointed out that the date (B.C. 543) given for the death of Sakya is doubtful, "the more plausible time being B.C. 477," and it is not improbable that it occurred even 200 years later. The Ceylon datum upon which the Buddhists' calculation is founded, is not reliable, as it does not agree with the date of Chandragupta and Asoka's reigns, the keystone of Indian chronology. The probable commencement of Asoka's reign was B.C. 263, and his inauguration B.C. 259, which is stated in the "Mahawanso" to have been 218 years after Buddha's death, which would make it B.C. 477. A very old man, named Pindola, is stated in a popular legend of India to have been a contemporary of both Sakya and Asoka, which, if true, would make the death of Buddha about the middle of the fourth century B.C. M. De Körös makes it B.C. 430, and Westergaard, of Copenhagen, between B.C. 368 and 370.² There is also a discrepancy in the southern and northern MS., the latter making Asoka's reign one hundred years after Buddha's death.

It is rather remarkable that the name of Buddha does not once occur in the Girnar or Lat inscriptions of Asoka, although his doctrines are supposed to be promulgated in them; but it has been found in the Byrath inscription, also attributed to Asoka. Among the sculptures on the Sanchi Tope at Bilsah, Central India, there is an apparent representation of the young Prince Siddharta taking one of the drives already mentioned, but there is no trace of the old man said to have been seen by him on the occasion.³ Fa-Hian, at the end of the fourth century, mentions that he saw three towers which were built to commemorate the three drives of Buddha at Kapila-Vastu; they were also noticed by Hwen-Thsang a few centuries later.

¹ Müller, *His. Sansk. Lit.* 298.

² *Jour. Asiatique*, 1863, p. 116.

³ Fergusson's account of Sanchi Tope, p. 134; J. A. S. Beng., vi. 567.

“The particulars of Sakya's life are no doubt fabulous, and tend to shake our belief in the more probable statements about him; however, we may on the whole regard Sakya as an historical character, induced by peculiarity of temperament or accidental circumstance to adopt a religious life. Arriving after a number of years spent in meditation at what he regarded as Vital Truth, when he assumed the character of an inspired teacher, and founded a community (*Sangha*) of religious men and women, who professed a belief in his law (*Dharma*), at first conveyed under the form of Four Truths ‘*Arya satyani*,’ that sorrow is inseparable from sentient existence; that evil desire is the cause of sorrow; that there was a way of ending it, by following the means or path pointed out, that of virtue; such being probably the doctrine as it came from the hands of its founder, involving four principles—man may become superior to the gods (of the Brahmins). *Nirvana* is the supreme good—religion consists in the suppression of evil desire and practice of self-denial and benevolence—men of all castes and women may enjoy the benefits of religion.”¹

The story of Buddha is so attractive, Gower and Boccaccio have founded some of their romances on it, and it has somehow come to be inserted in the “Roman Martyrology” (Nov. 27), under the name of St. Josaphat, “who along with St. Barlam, spread the faith among the Indians on the borders of Persia.” Probably on the authority of a remarkable religious tale, attributed by some mistake to St. John Damascenus, who lived in the eighth century, it is called the “History of Barlam,” a holy hermit, and Josaphat the son of an Indian king, whom he instructed in the faith and virtue; “his father is said to have kept him in a palace, where during his youth he had never heard that men die.” De Couto mentions the story of St. Josaphat and Buddha, (Decade v. vii. 16), and Max Müller reproduced it in an article in the “Contemporary Review” for July, 1870.² It also forms a work called the “Paradise,” written in the tenth century by Metaphrastus.

¹ Beal's “Fa-Hian,” pref. xlix.

² “Le Martyrologe Romain marque au 27 Novembr la fête Barlaam et de Josaphat, comme de deux saints effectifs, dont il assigne le culte chez les Indiens

There are few subjects on which there has been more controversy than Buddhism, or so many surmises as to its origin. It has been sought to identify Sakya with the "Tayal" of the Philippines, with the Thoth of the Egyptians—Turm of the Etruscans—Mercury, Zoroaster, Pythagoras, Woden, Manes of the Manicheans, Daniel, &c.; and he is stated to have been known to the Celtic Druids, Welsh and Irish, whose "round towers" are attributed to his followers.¹ Out of this long list of comparisons, which is the most absurd, Klaproth ridicules the idea of there being any identity between Woden and Buddha; "nothing," he thinks, "could be more dissimilar." What similarity could there be between the ferocious, savage followers of Woden drinking coarse fermented liquors to excess out of skulls and revelling in slaughter, and the ascetic water-drinking disciples of Sakya, to whom fermented drinks are an abomination, and who have never been accused of any fighting propensities? Mr. Westergaard, who has recently written a work on this point, says, "the Icelandic language resembles the Sanskrit, and that 'Mára,' the Buddhist devil, is known in Scandinavia."²

Many writers think Sakya was a reformer of Brahminism. Klaproth,³ a good authority, says, "Buddha appeared as a reformer of the dominant religion of India, rejecting the authority of the 'Vedas' with their bloody sacrifices." Nevertheless, it would be difficult to say positively that Brahminism is more ancient than Buddhism. The Rev. Mr. Gogerly,⁴ on Ceylon authority, says Sakya only revived the doctrines of the previous Buddhas which had been forgotten. Colonel Sykes⁵

voisins de la Perse. Au jugement de M. Huet et de beaucoup d'autres, cette histoire n'est qu'un roman spirituel. L'Abbé de Billey, Baronius, et d'autres savans, l'ont cependant reçue et fait passer pour vraie. . . . L'ouvrage a été retouché par quelque Grec postérieur favorable aux Latins. L'original est dans le Bibliothèque du Roi."—Bib. Sacrée, Paris, 1822, iii. 101. Butler's "Lives of the Saints;" Cave, p. 341; Beal's Fa-Hian, p. 86.

¹ J. R. A. S., Higgins, i. 153; Hardy, Bud., p. 327.

² Article on Woden and Buddha, by Rajendralála Mitra, J. A. S. Beng., 1858, p. 46; 1864, 569; Klaproth, Mém. sur l'Inde, ii. 93.

³ Mém. sur l'Inde, ii. 55.

⁴ Appendix to Lee's "Ribeyro."

⁵ J. R. A. S., vol. vi., xiii. 114. "The first actual writings, the first well authenticated inscriptions, are Buddhist."—Max Müller, Hist. Sansk. Lit., p. 520; Col.

has also written in defence of the greater antiquity of Buddhism which he sees everywhere, and Brahminism nowhere until a comparatively recent period. All the ancient cave temples and coins are Buddhist, all the ancient inscriptions are Pali and Buddhist, neither Sanskrit nor Brahmin, all the Indian princes in Fa-Hian's time were Buddhist; even the great Brahmin festival of Jagannâtha is of Buddhist origin, being described by Fa-Hian and subsequently adopted by the Brahmins; and Buddhist emblems are found on the temple of Jagannâtha. M. De Maupied and Mountstewart Elphinstone are on the other side. It is also uncertain whether Buddhism took its rise in the East or West, although probabilities are in favour of the latter. Somnath in Guzerat was originally a Buddhist temple, and one of Sakya's teeth was deposited in a tope at Salsette. M. De Maupied was of opinion the Jews carried captive by Shalmanesar into Afghanistan were the originators of Buddhism, and a writer in the "Asiatic Researches" for 1807 tries to identify the Druids with the Brahmins. All we know for certain is, that a fierce struggle existed for many centuries on the Continent between the rival sects, which ended in the expulsion of Buddhism from the Indian Peninsula many centuries ago, the exact time not being known; Colonel Sykes extends it to the eleventh century A.D. Mr. Fergusson, F.R.S., thinks Buddhism a raising up of the aboriginal casteless Hindus to a temporary supremacy over the aristocratic Aryans; when Buddhism broke down it was replaced by the modern Brahmin worship of Seva and Vishnu, a religion of some of the original inhabitants.

The corruptions and exclusiveness of the Brahmins probably gave rise to Buddhism, a revolt against the sacerdotal supremacy of the Brahmins, an effort to admit all to the knowledge which they reserved to themselves; Sakya's doctrines, thrown open to all, were eagerly accepted by the lower classes excluded

Low, J. A. S. Beng., 1849; Maupied, "Essai sur les Peuples Anciens," quoted by Sir E. Tennent; Chinese MS. say, last three Buddhas taught the same doctrine as Sakya.—Beal's Fa-Hian, p. 66. "The doctrines ascribed to Buddha were popular in their character and well designed to secure the attention of all; they were just what men like to listen to; they were invited to take refuge in something that promised them protection."—Rev. S. Hardy, "Legends," p. 202.

by the aristocratic Brahmins, through their elaborate system of castes, from all participation in their privileges; his first disciples appear to have been outcast Chandálas.

Beyond personal controversy with Sakya and threats against himself, Buddhism does not appear, as far as we can learn, to have been at first much opposed by the Brahmins, but was not, however, triumphant in India until the time of Asoka, who has been called its "Constantine," the grandson of a "parvenu" (Chandragupta), who broke through castes when he was elevated to the throne of Northern India. Asoka is supposed to have adopted the Buddhists, who denounced castes as his natural allies,¹ while, according to some, the revolution which placed Chandragupta on the throne was an attempt on the part of the Brahmins to subvert Buddhism, the national religion.²

Burnouf gives it as an indubitable proof of the priority of the Brahmins that the Buddhist "Sûtras" of Nepal use Brahmin terms in their definitions. Bhagavat, a common title applied to Sakya, occurs in the "Vedas" as a designation of the deity or supreme power. Little value can be attached to the statements of the Chinese and Ceylon Buddhists, that the previous Buddhas preached the same doctrines as the last; there is no proof that some of Sakya's precepts were heard of in India until his time. De Körös says, among the Tibetans every doctrine is referred to Sakya, the last Buddha. Some suppose³ Buddhism of Christian origin, and traceable to the Gnostics whose doctrines it resembles, and hence the monks, nuns, crosses; candles, mitres, and other Christian emblems and customs, including confession and expiation, found among⁴ the Buddhists of Nepal and Thibet. There is reason to suppose⁵ that Christianity, which spread to Persia in the first century, reached Northern India at the same period; there were Christians in India A.D. 51.⁵ The early date ascribed

¹ "Buddhism had no history before the time of Asoka."—Max Müller, "Chips from a German Workshop."

² J. R. A. S., 1864. *Vide* ch. vii., ix.

³ J. A. S. Beng., 1854, "Legends of the Punjab."

⁴ C. de Körös, the Dul-Va., J. A. S. Beng., 1832.

⁵ J. A. S., 1834, p. 173.

to Buddhism is doubted, not being mentioned by Megasthenes or in the account of the invasion of India by Antiochus (B.C. 108), being first positively described as an Indian religion by Fa-Hian (A.D. 400). The inscriptions attributed to Asoka are an obstacle to this view; but as the names of Indian Rajas are often repeated, this Asoka may have been some other besides Chandragupta's grandson. The Christian emblems found among the Thibetans are attributed by some to the missionaries, who visited Central Asia in the fourteenth century,¹ and to a remarkable religious movement which occurred among them about that time, owing to a kind of Luther, or reformer, who established his sway there, and became the "Grand Lama of Thibet," the first of the order. The shaven heads and yellow robes of the south are more truly Buddhist than the red robes, hats, and mitres of Thibet. Among the religious devices of the Buddhists is one that is certainly not Christian; "the praying wheels," as they are called—circular machines, to which prayers are pasted and then turned by the hand, thus saving the trouble of repeating them—the faster they are turned the sooner the prayers are got over, and some are worked by water, a still further saving of time and trouble.

The resemblance between Buddhism and Christianity is in many respects very startling, especially in the charity and control of the passions they both inculcate; but Buddhism is more akin to the vagaries of the Gnostics, especially to Manicheism, than genuine Christianity, and it yet remains to be proved whether Buddhism is derived from the Gnostics or their ideas from Buddhism. The Rev. S. Beal points out the singular coincidence "that Christianity was spreading westward (to Italy, Gaul, and Spain) about the same time that Buddhism was extending eastward into China."²

We are far from knowing with any degree of certainty what were the real doctrines of Sakya; that they were attractive and novel may be inferred from the accounts given us of the number of enthusiastic disciples who followed him, whose only object was to imitate the stern simplicity of his life. All

¹ J. R. A. S., vol. iv., new series.

² Catena of Bud. Scrip., 1871.

the accounts of Buddha given by his followers are related in such a truly Oriental strain, so abound with fabulous legends, we cannot get at the truth from them. Turning to the "Rock and Lat" inscriptions of Asoka, the oldest exemplars of supposed Buddhist doctrines to be found, we are not much more enlightened. They inculcate respect to parents, charity to neighbours, and humanity to animals, forbidding the taking of life, recommend keeping the body temperate and the tongue from evil speaking. The Girnar edict speaks of the happiness of virtue, "Dharma mangalam," and alludes to the four rules of virtue, but does not define them; and the eleventh edict expresses a hope of reward in another world for good actions in this,¹ which is all the information to be obtained from this source. Prinsep thought "Buddhist doctrine originally was only a reform of the worst features of Brahminism, a dissent from the greater part of their metaphysics and sophistry without an absolute relinquishment of a belief in their gods; the term 'Devanampiya' applied to Asoka shows the retention of the Hindu pantheon at that time." Some say the Girnar edicts do not represent real Buddhism, and it remains to be shown that they are identical with the doctrines of Sakya. There is nothing contrary to Buddhism in them or in those of the "Lats," but they omit all mention of its leading tenets;² the nearest approach to them is found in the Byrath inscription, which names the Buddhist triad, "Buddha, Dharma, and Sangha,"³ also monks and nuns. Tenderness to life, and the other virtues named in the edicts, were inculcated by the Brahmins, and some are Jewish. Dr. Bird thinks Buddhism resembles the old form of Sabeian idolatry, there being a strange association of Buddhist invocation with honour to the sun in the sculptures and cave inscriptions of western India.⁴

Supposing Sakya to have existed at the time stated accord-

¹ J. A. S. Beng., vi. 596, 957, vii. 225; Burnouf, "Lotus," app. x. p. 731; Max Müller considers the Dhammapada to give a good idea of Sakya's doctrines.

² J. A. S. Beng., 1852, p. 615.

³ The Buddhist Triad is a term applied to three words in use among the Buddhists, Dharma means the law or virtue, and Sangha the congregation or church

⁴ Bombay branch R. A. S. J., 1844; J. R. A. S., xii.

ing to the earliest calculations none of his precepts were committed to writing until B.C. 250, or nearly 300 years after his death, leaving ample time for the invention of absurd legends, and the writings now extant are evidently only compilations from previous documents. "The idea of a faithful translation is foreign to oriental minds, granted that Mahindo translated the original Pali into Sinhalese, there was nothing to restrain him from inserting anything he thought useful to his new converts; so also Buddhaghosa, his statements are worth no more than Geoffrey of Monmouth's account of Prince Arthur."¹ How can we reconcile the statement that Buddha died from eating pork given him by the smith Chunda, with the prohibition not to take the life of any animal? The killing and eating of animals is forbidden in the laws of Menu,² and the abstaining from flesh and the drinking of ferments existed among the Brahmins. Dr. Hunter, in his "Orissa" (i. 134), says, according to Chaitanya, the apostle of Vishnu worship, the destruction of the least of God's creatures is a sin, and that self-immolation is also opposed to this worship. Colonel Sykes says, abstaining from the flesh of animals formed no part of original Buddhism. May not Sakya have been a reformer in this as in other matters? and have not his followers reverted to the old ideas; however, the use of animal food is said not to be absolutely forbidden among them, although with an obvious inconsistency they strain the water they drink for fear of killing any stray animalcules in it. In fact the prohibition to take life, however it came to be a tenet of Buddhism, has always been evaded when it was found convenient to do so, none but the extreme devotees among them living on vegetable food; again, so many drinking scenes, where men and women are mixed together, are delineated among the sculptures on the Buddhist tope of Amravati, supposed to be of the fourth century A.D., that it makes one doubt any prohibition against the use of ferments existed at that time, and it is an argument in favour of the Woden theory.³

Many attempts have been made to detect Buddhism in the

¹ Max Müller, Hist. Sansk. Lit., i. 298.

² Laws of Menu, v. 51.

³ J. Fergusson, F.R.S.

accounts of Megasthenes, and other ancient Greek writers on India, but their meagre and obscure statements apply rather to the Brahmins. The Gymnosophists, Sarmanas, or Brachmani of Megasthenes, "naked ascetics living in woods, subsisting on roots, and burning themselves on a pyre when old,"—were prototypes of the modern Jogis or Fakers among the Hindus, and existed before Buddha, being mentioned by himself; in fact, he partly followed their example for six years in the forest of Uruwella. The asceticism and self-purification of Sakya was probably derived from the Hindu system of Pantajali, the doctrines of the Pantajali, Sûtra being supposed anterior to Buddha, and his first teacher, Arata Kalama, a follower of that system.¹ But the self-murder and nakedness of the Gymnosophists formed no part of Buddhism. Strabo (lxxv. 686) mentions that a Gymnosophist burnt himself alive at Athens in the time of Augustus. He had been sent as a present to the Emperor by a Pandyan prince. Arrian speaks of sophists of any cast—query, did he mean Buddhists?

Clemens Alexandrinus says, there are in India Sarmanæ or Brachmanes, and Sarmanis, called Allobii, who do not marry, live on acorns, drink water with their hands, and dress in bark; also those who follow Buttæ, who first taught virtue. In another place, on the authority of Polyhistor, he speaks of Brahmins who neither drink wine nor eat meat, and believing in a second birth despise death (just as modern Hindus suffer and die to ensure a happy birth next time). St. Clement also alludes to holy women, probably the Bhikshunis, or Buddhist nuns; also a name given to a male follower of Sakya. These statements are not to be found in any other ancient writer, some suppose them to have been originally derived from passages in Megasthenes (not extant), unnoticed by Plutarch, Strabo, and other authors. The passage about Buttæ is very obscurely worded, and may have been written from information obtained from Indian residents at Alexandria. Bardesanes, who lived in the second century A.D.,

¹ Comilla Vijasenha, J. R. A. S., 1870, vol. v.; Colebrooke, Philos. of the Hindus, Asia. Jour., 1839; St. Clement Strom., i. cap. xv.; Sarmanæ may be from Sramanas, Buddhist novices.

appears to describe Buddhist priests, "men who shaved their heads, put on robes and left their wives, living in houses founded by kings (monasteries), who gave them a daily allowance of food," a custom mentioned in the "Mahawanso." Palladius describes people supposed to be Brahmins, but his account seems to refer rather to Buddhists. In Damascius's life of Isidorus, preserved by Photius, there is an account of some Brahmins who visited Alexandria, and lodged with Consul Severus (A.D. 470); "they ate palms and rice and drank water, and by their prayers could bring down rain."

The name of Buddha occurs in Christian controversial writings of the third and fourth centuries. One was associated with Manes, the Heresiarch. Neander, in his "Church History" (i. 817), says the Manichees believed Buddha and Christ were the same. The name also occurs in Archelaus's account of his dispute with Manes (A.D. 275), in the "Catacheses" of Cyril of Jerusalem (A.D. 361), and in the "Heresies" of Epiphanius (A.D. 375). They all trace the Manichean doctrine to one Scythanus, born in Palestine, and familiar with the Greek language and literature, a contemporary of the Apostles, and a merchant in the Indian trade. In the course of his business he several times visited that country, and made himself acquainted with Indian philosophy, subsequently marrying an Egyptian slave. He settled at Alexandria, and wrote four books, the foundation of the Manichean heresies. Hearing of the Jewish scriptures he started for Jerusalem, and disputed with the Apostles, where he died. At his death, one Terebinthus, a companion of his, seized his books and wealth, and proceeding to Babylon took the name of Buddha, giving out that he was born of a virgin, and learned in Egyptian mysteries. St. Hieronymus (A.D. 420) mentions a Buddha; and a third Buddha, Perioductes, lived in Persia (A.D. 570). A virgin mother of Sakya is unknown to the Buddhist of Ceylon or India, but the idea has been adopted by the Chinese and Tartars.¹ However, the Buddhists of India in their legends have exalted Maya, his mother, far above all other women. It

¹ Priaulx, J. A. S., xix. 277, 289; Epiphan. ii. 66; Hierony. Part I. ch. xxvi.; Gildemeister, "Scrip. Arab.," p. 104.

is rather singular that Buddhism has not been mentioned by Cosmas, but Marco Polo relates the story of Sakya's adoption of an ascetic life, saying "if he had been a Christian he would have been a great saint of our Lord, so good and pure was the life he led."

Nirvāna.—Another subject of controversy is the meaning of "Nirvana," a compound Sanskrit word, derived from "*va*," a breath of wind, with the preposition "*nir*," which signifies calm.

By many Buddha's teachings are thought to be nothing but a thinly disguised Atheism, in the attempt to provide an escape for the human soul from the miseries of this life, and transmigration from one body to another after death; not by denying transmigration altogether, but by pointing out the possibility of arriving at an end of it through the practice of virtue, self-denial, and contemplation in "Nirvana." Brahminism and Buddhism both inculcate Metempsychosis, but while the result of successive births is to bring the soul of the Hindu nearer and nearer to the final beatitude of absorption in Brahma, Buddhism leads to extinction.

Nirvana is too metaphysical a subject to be ever satisfactorily determined. Rajendralāla Mitra, in a note to his edition of "*Lalita Vistara*," says this is a vast subject in Hindu orthodoxy. Even the orthodox Buddhists are divided into four sects, according to their meaning of the term. It may mean abode of bliss, or exemption from transmigration; positive nihility, or equivalent to eternal matter. But after all, he says he finds himself, in trying to explain it, in the same predicament as Cicero, when he said "Although I have translated the '*Timæus*' of Plato, I do not understand it" (p. 26).

M. Pauthier says, "It is hard to believe that for more than two thousand years so many millions of human beings have been practising with so much zeal a religion which offered no other consolation for all their self-denial, than annihilation."¹

¹ "Nous ne pouvons croire que depuis près de 2500 ans plusieurs centaines de millions d'êtres humains pratiquent avec tant d'ardeur et de zèle une religion qui ne leur offrirait pour toute consolation après leur mort que le néant!"—Pauthier's Polo, p. 595.

The burdens of this life and dread of transmigration can hardly have been so insupportable as to render the only alternative offered more desirable, and it will be seen presently that the idea is too repulsive for ordinary human nature, as an escape from it has been devised in China and Thibet; but in reality, "Nirvana," whatever it means, is only obtainable by a chosen few, such as the Arhats or Ascetics, who separate themselves from the rest of the world to live in meditation, an inferior and temporary kind of happiness, entailing further transmigrations, being offered to more worldly persons.

Colebroke, in his essay on the "Philosophy of the Hindus,"¹ maintains that Nirvana does not mean annihilation, but a state of dreamy listlessness; and others are of his opinion, but the majority look upon it as a cessation of all existence. Among these are two of the latest writers on the subject—Bishop Bigandet, vicar apostolic of Ava and Pegu,² who is most decided on this point, and D'Alwis, of Ceylon, who says the result of his studies is "that Gautama Buddha was an atheist, in the sense of one denying an absolute eternal supreme being, and that he not only denied to man a soul, but placed him, as regards a future existence, on a level with the brutes that perish, but also held the total extinction of being the summum bonum of existence."³ Barthélemy Saint Hilaire, and Remusat, can find no trace of an idea of God among the Buddhist works they have searched, either in India or China.

Max Müller, in his essay on "Buddhist Pilgrims," came to the same conclusion, but has recently changed his opinion, and now thinks "Nirvana" should not be interpreted quite in an atheistical sense. He quotes some Buddhist works where it is said Sakya was seen by his followers after obtaining Nirvana; and verse 126 in the "Dhammapada" (or Path of Virtue) which says "some are born again; evil-doers go to hell, righteous people to heaven; those who are free from all worldly desires enter Nirvana."⁴ On the contrary Mr. Childers, in an article

¹ Phil. of Hindus, p. 221.

² Quoted by Max Müller, *Parab. of Buddhaghosa*.

³ D'Alwis, "The Buddhist Nirvana," Colombo, 1871, p. 1.

⁴ *Parab. of Buddhaghosa*.

on the "Dhammapada," quotes some verses in it which are quite atheistical: "I have run through the revolution of countless births, seeking the architect of this dwelling, and finding him not, grievous is repeated birth" (v. 153). "As hunger is worse than any disease, so existence is worse than any pain; to him who has realized this truth, extinction is the greatest bliss" (v. 203). Commenting on this, he says Nirvana appears to be two-fold, and has a double meaning; one, the extinction of human passion, "Upadhicesha-Nirvana," and the other "Anupadhicesha-Nirvana," or "Skandhapar-Nirvana," the annihilation of being. The Arhat, or being who has attained final sanctification, though free from human passion, is still a man, but he alone among men when he dies ceases to exist; the oil in the lamp is burnt out, and he enters the vast portals of nothingness and void."¹ Colonel Sykes denies there is any atheism in early Buddhism, not being found in the inscriptions, or in Fa-Hian, which is true; but are the inscriptions Sakya's genuine doctrines?²

The most atheistical part of the Buddhist doctrines is the almost total absence of any allusion to a Supreme Being, and the all-sufficiency of man's own exertions to attain its aim of happiness, Buddhism exalting the individual man into an absolute supremacy over all existing things. Strangely inconsistent with this want of belief in a Supreme Being, is an evident graft from Brahminism—the constant mention of an evil spirit *Māra*, or devil, a word which means literally "to kill;" and they have several hells for the punishment of the wicked, but whether eternal or not does not seem clear, also several heavens of different degrees, serving apparently as the temporary residence of holy men, who have yet to go through further births and transmigrations before they attain "Nirvana." The chief heaven is called "Tusita," literally the abode of joy, the highest mansion in the world, where Sakya resided before he came on earth the last time.

Three degrees of mental or moral capacity, according to the Tibetan books, are required for the reception of their doc-

¹ J. R. A. S., vol. v. p. 219, new series.

² Csoma Körös, *Asia. Res.*, ch. xx.

trines. "Men of vulgar capacity must believe there is a God, and future life where they will be rewarded, while those of superior intellect must know that all things perish, that there is no reality, and that deliverance from pain or bodily existence is final beatitude," which is similar to the Gnostic doctrine, "that faith, the foundation of Christian knowledge, was fitted only for the rude mass, the animal man, who was incapable of higher things; far above these were the privileged natures, the men of intellect, the spiritual man, whose vocation was not to believe but to know,"¹ who may be considered equivalent to the Arhats of Buddhism.

Although the atheistical meaning attached to Nirvana is said to prevail among the Buddhists of Ceylon, there appears to be two schools of Buddhism in China and Thibet—the philosophical and religious; the latter rejecting a theory which leaves no hope beyond the narrow horizon of this life, and following the natural yearning of the human heart after another and happier world, and a belief in some power greater than himself—believes in a supreme and merciful being called Adi Buddha in Nepal, and Kwan-yin, or Amita Buddha, the Sanskrit Avalokitesvara, in China and Thibet. Kwan-yin is also called among the Chinese "the Great Manes," and is a worship allied to that of Vishnu, Kwan-yin being regarded as a Saviour of men.² The Rev. S. Beal says the "Amṛtabha Sūtra" contains an account of a Chinese Western Paradise, an idea which appears to have originated in the first century A.D., through intercourse between Southern Buddhists, and foreigners from Alexandria, and taken to China A.D. 526. Hwen-Tsang speaks of a peak in South-Western India, called *Po-ta-la-ka* (supposed to mean Pedro-talla-galla, in Ceylon), the residence of Amitabha Buddha, or Kwan-yin, where he occasionally reveals himself. This paradise is the desire of the great body of Buddhists in China and Japan."³

¹ Dean Maunsel on Gnosticism.

² "A belief in a Supreme Being is a graft on the unqualified atheism of Sakya, the doctrine of Adi Buddha is local in Nepal."—Prof. Wilson, J. A. S., vol. vi.; according to Col. Sykes, Nepal Buddhism is only a corrupt species of Brahminism.

³ J. R. A. S., ii. p. 425, new series; Wassiljew. der Buddhismus, p. 120.

Buddhism has not escaped schism and division into sects. The cloven hoof showed itself only seven days after Sakya's death, when his disciples met to celebrate his obsequies, signs of discontent with the monastic restraint they had been subjected to breaking out amongst them; Subhadda, an old man, saying, "We are well rid of that arch-priest (Buddha), and the constant dread of his admonitions 'Don't do this,' and 'Don't do that;' now we can do what we like." Maha Kasypa, who was made his successor or chief disciple on this occasion, apprehending the result of such language,¹ decided to call a convocation of all Sakya's followers, to collect his sayings and form a code of doctrine, which met two months after. (*Vide ante*, ch. xxii.)

De Körös in the "Journal of the Asiatic Society of Bengal," 1838, gives a description of the four principal systems of Buddhism now in existence, the first of which originated with Ráhula, Sakya's son or grandson. They are all distinguished by the different number of pieces of cloth in their yellow robes. Seventeen heresies are mentioned in the "Mahawanso" as having occurred in the second century after Buddha's death. At the present time his religion only survives in the Indian peninsula, in the doctrines of the Jainas² of Guzerat and Rajpootana, which are widely different from those of the Lama of Thibet, or the metaphysical monks of Nepal, varied again by the pantheism and demonology of China and Japan, while in Ceylon it is largely infected with Brahminism and demonology. Even in Fa-Hian's time Buddhism in India had arrived at a stage of development that foreshadowed its approaching decline. It had returned, after flourishing for 800 years, to the pantheistic worship, in opposition to which it had originated. For instance, the processional car described by Fa-Hian, the pro-type of the modern Jagennátha.

"The Sautrantika school generally followed in Ceylon, whose text-book is the 'Agama,' is root and branch opposed to the Vaisbashikas of Northern India, whose text-book is the

¹ Mahav., p. 11.

² An account of the Jainas by Colebrooke will be found in the *Asia. Jour.*, 1827, p. 558; they are all of one caste; also by Dr. Bird, *Bombay J. A. S.*

'Vaisbasha.' " (*Vide* Beal's "Fa-Hian," where an account of the different schools of Modern Buddhism will be found.

Buddhism has been called a religion without a God, and has, strictly speaking, no worship, sacraments, or liturgy; only meditation, preaching, and reading Sakya's Sûtras, with honours paid to his statues and relics, such as offerings of flowers, fruits, lamps, or incense to them, either on altars of temples, or in dagobas. Images of Buddha are an obvious innovation on his doctrines, and first mentioned in Ceylon at Mihintala, A.D. 246; they are not regarded with idolatrous veneration, but as memorials; neither is Buddha himself worshipped, being only held up as an ideal model of what every Buddhist may become by following his example. In fact, any worship of him would be inconsistent with a belief in his having ceased to exist in any form, although some of his more ignorant followers may do so, especially where Buddhism has degenerated into Pantheism. "Buddhist ceremonies in Ceylon at present are more secular than religious, as the great Perahera festival held at Kandy."¹

Brahminism.—As this system is constantly alluded to in these pages, it is desirable to give an idea if possible of what it is. Brahminism is the most subtle, complex, and debasing system of religion ever put forth. Protean-like* it assumes a thousand shapes. Any accurate definition of it is almost impossible. Hindu theology is, in fact, an elaborate Pantheism, which, some suppose, took its rise in the adoration of the powers of nature, especially of the sun, moon, and stars, and a sole eternal creator of all. "Brahma," represented with four faces, afterwards developed into a triune divinity, composed of a creating power, Brahma; a preserving power, Vishnu; and a destroying power, Seva. Strangely enough, there are no temples erected to Brahma, who is assigned an inferior position by the masses. From Vishnu and Seva have proceeded endless incarnations or manifestations, all worshipped as Gods, who assume each other's parts in the most perplexing manner. Some of the Hindus place themselves under the patronage, or devote themselves to the especial adoration of Seva, others

¹ Tennent. *Vide* "Asia. Jour.," 1818, vi. 19.

that of Vishnu, and are distinguished from each other by marks on their foreheads, while the Brahmins are the priests of the whole system.

The worshippers of Vishnu are distinguished by having a sort of trident marked on their foreheads, with sandal or cow-dung ashes. Those of Seva have a few horizontal stripes or one round spot in the middle. Brahminism is probably much more modern than is generally supposed. There is no reference in the "Vedas" to Durga, Seva, or Vishnu, the popular gods of the present time. These most ancient of Hindu poems are invocations to the powers of nature—the "Maruts," or storm gods; "Agni," the morning dawn, or the sun, celestial light, etc. This simple adoration of all that is sublime and beautiful in nature being subsequently developed by the Brahmins into the corrupt system which bears their name.

Buddha's relics.—It appears that at Sakya's death and obsequies some teeth, bones, and hair were carried away as relics by his disciples. Of the four eye-teeth one, it is said, passed to the heaven of Indra, the second to the capital of Gandara, the third to the king of Kalinga, and the fourth to the Nāga kings. The Gandara tooth was carried off by Sassanid invaders, and may be the one which Chinese annals say was taken to China in A.D. 530 by a Persian embassy to the Celestial Empire and is now shown at Fuchu, where it was seen by Fortune during his travels in China.¹

As time went on numbers of other bones of Buddha turned up in various miraculous ways, and all the Buddhist princes struggled with each other to obtain some of these relics,² an enormous number of shrines and monuments being erected to his honour in various countries, among them Dagobas, in Ceylon, one containing a collar-bone. F'a Hian speaks of a tooth at Balistan, in the Himalaya.

The only relic of which there is any connected narrative³ is

¹ Fortune's China, ii. 108; Koeppen, i. 521, quoted by Col. Yule, "Marco Polo," ii. 266; Hwen-Thsang mentions other teeth which he saw in his travels.

² D'Alwis, "Life of Buddha," Colombo, 1862.

³ Mahanamo's account in the "Mahawanso" is taken from a work now extant, called the "Dalada-wanso," written in Elu, from which Mr. Turnour also took his

the famous tooth of Ceylon. The "Mahawanso" says, after the funeral rites of Buddha had been performed at Kusinaria (B.C. 543) one of his disciples carried his left canine tooth to Dantapura, in Kalinga, the modern Puri or Jagannátha; here it is said to have been preserved for nearly 800 years. Early in the reign of Guhasiwo, raja of Kalinga, the Brahmins instigated a war against him, accusing him of worshipping a bit of bone, when it was captured by them and carried off to Palibothra, where they tried to destroy it, but its miraculous resistance to all their endeavours converted the king, who in a fit of piety sent it back to Kalinga.

In the ninth year of the reign of the same Guhasiwo the nephew of Kheradharo, a Brahmin raja, tried to get possession of it by declaring war against him; when the Raja directed that in the event of a defeat, as the result of the conflict seemed doubtful, the relic should be conveyed to Ceylon by his daughter Hemánála.

During the struggle that ensued the daughter of the king fled with it to Ceylon, concealed in the tresses of her hair, about A.D. 310.

A Siamese account of the flight of this princess to Ceylon, translated by Colonel Low, in the "Journal of the Asiatic Society of Bengal" for 1848, says, the father of the princess was attacked by a confederation of kings in order to get possession of the relic. On her voyage she was wrecked at a place called the Diamond Sands, supposed to be near the Kistnah river, where they buried the tooth for three days, and then sailed for Lanka in a sewn vessel. This version represents some traders from Rom (Rome) who happened to be in the vicinity at the time, as assisting the princess in her flight.

According to Mr. Turnour, it was captured in the beginning of the fourteenth century by Ariya-chakawati, general of Kulasakera, king of Pandya, and conveyed to India, where it remained until Prakrama III., king of Ceylon, went in person to the continent to treat for its surrender, and succeeding in

account of the relic given in the Jour. A. S. of Bengal, 1837, vii. 856; but he is said to have only translated part of it. The "Dalada-wanso" was translated into Pali in A.D. 1196.

his mission carried it back to Polanarrua. It was subsequently removed to Kurnagalla, 1819, then Gampola and Kotta, near Colombo, usually accompanying the court.

Mr. Fergusson, F.R.S., in the "Journal of the Royal Asiatic Society" for 1868,¹ says it appears that the tooth was taken back to India (1187) when Kirti Nissanga, prince of Kalinga, reigned in Ceylon, where it remained seventy-six years previous to its recovery by the Sinhalese in A.D. 1314; but the Chronicles are quite silent on this point.

Marco Polo says, "several teeth of Buddha were preserved in Ceylon, and that Kubali Khan obtained two of them. No doubt the envoys were imposed on, not a solitary instance in the accounts given of this wondrous relic, for the Dalada seems in all ages to have had a unique history."

Buddhist sovereigns appear in all times to have been very anxious to possess the tooth. In the eleventh century Anarapta, king of Burmah, sent a mission to Ceylon, which seems to have had a special manufactory of them, to endeavour to obtain it, but only got a miraculous emanation. The place where this tooth was preserved is still shown, in a building attached to the palace of Amarapura. It is said when the English got possession of the Kandyan tooth, in 1815, that the king of Burmah, Minderagu Praio, sent two embassies to Calcutta to treat with them for it.²

After its recovery from the Tamils, the next episode in the history of the Dalada is its alleged discovery by the Portuguese in Jaffna, when they captured that town in the year 1560; they sent it to Goa, where after some controversy between the viceroy Don Constantine de Braganza and the archbishop it was destroyed, the archbishop himself pounding it to powder with his own hands in a mortar. It was then

¹ Some years ago Dr. Bird opened a small tope near the Kankeri caves, Salsette; in it he found a copper-plate recording that a canine tooth of Sakya had been deposited there. The plate was dated A.D. 245.—J. R. A. S., 1868, p. 150. A potentate named Asoka is mentioned in Col. Low's translation of the Siamese MS. who could hardly have been the Great Asoka (B.C. 250), as supposed by him. *Vide* Fergusson's "Account of the Anravati Tope."

² Col. Yule's mission to Ava, pp. 30, 196.—Marco Polo, note to Upham's "Rajaratnacari," ii. 70.

burned in a brazier of charcoal and the ashes thrown into the river.

This ceremony is fully described by De Couto¹ in his account of the siege of Jaffna. He relates that the king of Pegu, the most powerful and wealthy prince of his time, hearing that the tooth which was so much revered by all Buddhists was in the possession of the Portuguese, made unlimited offers in money and other advantages in exchange for the relic, offering in money alone 300,000 or 400,000 cruzadoes,² but the archbishop of Goa prevented the viceroy from acceding to the king of Pegu's offer, although Don Constantine and his chief officers were very eager to do so, being anxious to replenish their coffers.³

Of course the Sinhalese maintain that the Dalada at Kandy is the genuine tooth, as it had been sent to the Saffragam district to preserve it from the Portuguese, and it does seem very unlikely that the Kandyans should have placed a relic so much valued by them in a town like Jaffna, inhabited by Tamils and Brahmians, in the extreme north of the island, when there were so many other places quite out of the reach of the Portuguese to conceal it in; but there has always been so much confusion and palpable falsehood in the account of the Dalada that nothing certain is really known about it. Previous to the alleged capture by the Portuguese it was last heard of at Cotta, while at the same time the Chinese said they had it. As already mentioned, whenever it was captured by any of the various parties contending for it, a substitute was soon found by the priests and a statement put forth that it had been recovered miraculously.

There appears to be no doubt that the Portuguese did

¹ "Assentado isto, e feito hum Termo, em que todos se assignáram, cujo traslado está em nosso poder na Torre do Tombo, mandou o Viso-Rey ao Thesoreiro que trouxesse o dente, e o entregou ao Arcebispo, que alli presentes todos o lançou em hum almofariz, e com sua propria mão o pizow, es desfez em pós e os deitou em hum brazeiro, que pera isso mandou trazer, e as cinzas, e carvões mandou lançar no meio do rio á vista de todos, que se assomáram ás varandas, e janellas, que caham sobre o mar." De Couto, Dec. vii., l. ix., ch. xvii. 431.

² A cruzado is worth 2s. 9d. of our money.

³ Vide also Faria-y-Souza, "Portuguese Asia," ii. 206-208, 252.

destroy some relic of the sort, or what they fancied was the tooth. The first traveller who mentions the circumstance is Linschoten, who was at Goa about twenty years afterwards, but he says they found it at Adam's Peak.¹ Sir Thos. Herbert, who visited Ceylon in 1684, has another version, saying, "The Portuguese spoiled Colombo and took away the 'ape's tooth,' and in their zeal burnt it, refusing 300,000 ducats offered for it by the Zeylonese."²

Faria-y-Souza blames the viceroy, Don Constantine, for not having sold the tooth to the king of Pegu, "most of the Portuguese being for taking the money, as the immediate result of his virtue was that there were two relics set up in place of the one destroyed, one in Ceylon and another in Pegu, for the king of that country having been informed by an astrologer that he was to marry a Singhalese princess, sent an embassy to Ceylon to ask for one in marriage; but Don Juan, the king of Ceylon, who held his court at Cotta, having no children, a daughter of one of his nobles was substituted and despatched with all royal and nuptial honours, along with the Peguan ambassadors to Pegu." Faria tells us, "the galley of the royal bride was covered with plates of gold and rowed by beautiful amazons, richly clad and trained for this exercise."³

The ambassadors were informed while at Cotta by the minister of the king, who was anxious to obtain the immense ransom offered for the tooth by Brama, king of Pegu, that only a sham tooth had been destroyed by the Portuguese, for he possessed the real relic, which he kept in his own house, as the king, Don Juan, had become a Christian. When the king of Pegu was told this he sent new envoys and presents to Ceylon and obtained the tooth, which was conveyed to Pegu with great pomp and ceremony; but the king of Kandy hearing of the deception practised on the Peguan, sent to inform him of it, and at the same time offered his daughter in marriage, and the veritable tooth as her dower, the other two being counterfeits; however Brama declined to confess himself duped, and was satisfied with his tooth.

¹ Travels, Eng. Trans.

² Travels, p. 307. *Vide* ch. xiii.

³ "Portuguese Asia," ii. 252.

It is said the town of Kandy owes its origin to a Vihara built there in the thirteenth century as a safe place of deposit for the Dalada, the lower country being overrun by the Malabars, but it does not appear to have been permanently placed there until long after the arrival of the Portuguese, when Kandy became the capital of the native kings at the end of the sixteenth century; since then it has been the centre of the Buddhist hierarchy. At the insurrection in 1818 the tooth was carried away by the priests in charge of it, to aid the insurgents by its presence among them, but it was accidentally captured by the English, and brought back to Kandy. Dr. Davy describes the wonderful effect its capture had on the Kandians, who ceased their opposition to the British, saying, "they had a right to govern them as they possessed the tooth."

In order to prevent any further occurrence of this kind a guard was placed over the temple where it was deposited, and the keys of the apartment confided to the care of the Government agent of the district. By a singular coincidence Mr. Turnour, who translated the "Daladawanso," was at one period the guardian. Occasional exhibitions of the relic to the populace were permitted. This continued till about 1840, when, in consequence of absurd complaints in England that it was countenancing idolatry, the guard was withdrawn and the priests were allowed to do what they liked with their relic. But the danger of this proceeding was shown in 1848, when, only that the Government agent took possession of it in time, the tooth would have been again carried off to aid the insurgents.

The apartment in which it is preserved forms part of the Vihara, in the innermost recess of which is a small chamber or sanctum, about twelve feet square, without windows, and pervaded with a hot, oppressive, and highly perfumed air, proceeding from a profusion of lotus, champac, and jessamine flowers; the walls are lined with gold brocade, and the doors inlaid with carved ivory. On a solid silver table in the middle of the chamber stands a bell-shaped shrine, enclosing several of the same shape one within the other, the smallest and last of them containing a golden lotus on which the tooth is laid. The shrine is inlaid with gems and festooned with chains

set with gems ;^o but Dr. Davy says none of them are of any value. The relic is only a piece of yellow ivory, resembling the tooth of a crocodile more than that of a human being.

Another of the relics of Buddha, formerly exhibited in Ceylon, was his Patra or alms pot. All mendicant saints carry a bowl to collect alms—generally a coco-nut shell. This relic was most highly valued, and, oddly enough, the Mahometans say it belonged to Adam. The Patra had served three Buddhas, and was destined to serve the future one (Matreya). The great Asoka sent it to Ceylon, but it was carried off by the Tamils in the first century A.D., and brought back again by Gaja Báhu A.D. 113.¹

There are, as usual, several rival relics. Fa-Hian gives a long account of the migrations of the Ceylon pot. It was first at Vaisali, then Kandahar, Khotan, and Bick-balik. He speaks of one he saw preserved at Peshawur, and that poor people could fill it with a few flowers, whilst a rich man could not do so with 100, 1000, or even 10,000 bushels of rice ! It was of a mixed colour, in which black predominated. He also saw at Balistan, in little Thibet, a vase in which Buddha used to spit : it was of the same colour as the alms pot.²

Hwen-Thsang mentions that in his time (seventh century A.D.) the alms pot had been removed from Peshawur to the king's palace, Persia.

Marco Polo mentions (as related in Chap. XII.) that Kubali succeeded in 1286, after a good deal of negotiation, in obtaining the alms pot from the Sinhalese, and Sir E. Tennent obtained the following curious particulars from China, which seem to refer to the account of Marco. It is taken from a work written in 1350 : " In front of the image of Buddha there is a sacred bowl, which is neither made of jade, nor copper, nor iron ; it is of a purple colour and glossy, and sounds when struck like glass. At the commencement of the Youen dynasty under Koubali, three separate envoys were sent to obtain it " (Vol. i., p. 622).

In Reinaud's " Fragments Arabes " there is an account of a wonderful bowl given by an Arabian writer of the ninth

¹ Koeppen, i. 521.

² ii. 70, 106.

century which probably refers to the alms pot at Peshawur. "This bowl also belonged to Adam at the time when the father of mankind lived in Ceylon; it passed from hand to hand until it came into the possession of King Kend, or Kefend, who reigned in India in the time of Alexander the Great. The bowl possessed the virtue of never drying up. A whole army might drink from it without reducing the quantity of liquid it contained."

Viharas.—Buddhist temples in Ceylon are generally simple buildings, with whitewashed walls, and a projecting tiled roof forming a verandah, and surrounded by a low wall enclosing a small space of ground, usually situated on a slight eminence with steps cut in the hill; if on the side of a river steps are formed from the water's edge up the bank. They are always surrounded by numbers of flowering trees—such as champac, ironwood, *Lagerstroemia* and *Erythrinæ*, whose perfumed blossoms are used in the worship of which they form so poetical a feature. A Bo-tree is always found growing near the temple, derived from the original tree at Anuradhpura, shoots from which have been planted near every temple in the island.

Within the outer enclosure there is generally a small Hindu dewale dedicated to Kattregam, Patine, Parvati, or some other Brahmin deity, a compromise that forms a strange contrast to the deadly hostility of the rival religions in India. Hindu gods are said to be also found in Burmese temples. The priest's house or pansala, often little more than a shed, the better description being made of wattle filled in with mud and thatched with cajans, is situated in the immediate vicinity of the Vihara. (*Vide* ch. xxii.)

The temple consists of two apartments—an outer and an inner, one which is dimly lighted by oil-lamps and contains various statues representing Sakya exhorting his disciples with two fingers of the right hand raised, seated under the tree at Uruwella, or reclining in a state of blissful repose in Nirvana. The air of this apartment is highly perfumed, chiefly with the yellow flowers of the champac, their favourite colour. One peculiarity of Buddhist worship is the profuse use of flowers, every part of their Viharas being thickly strewn with them.

On the walls of the outer apartment are usually a series of barbarous paintings depicting the transmigrations of Buddha. A creature having the figure of a man and the head of a bird, with the bill of a hawk, resembling the Egyptian Thoth, is not uncommon among them. An ample account of Buddhist temples will be found in Clough's work.

All the utensils of the Viharas are of brass, as in the Jewish temples of old.¹

In many respects the Buddhist temples of Ceylon are very inferior to those in India; even the great Hindu Pagoda at Ramiseram has more pretensions to architecture than any of them. The most remarkable are the rock temples, many being formed under overhanging ledges of gneiss, as in the picturesque Alu Vihara at Matele; or in caves, as the great temple at Dambool, the largest in Ceylon. These are also very inferior to the rock temples of India,² which in many cases have been excavated with great labour out of the solid rock, leaving cut pillars at intervals to support the superincumbent weight, while those in Ceylon have been formed in natural cavities in the gneiss rocks. The Gal Vihara at Topare, formed in the twelfth century by Prakrama Báhu, is the only instance of a rock-cut temple in the island.

The temple at Dambool is constructed in a vast cavern in the side of an immense mass of gneiss rock which rises above the surrounding level country, forming a conspicuous landmark. A steep path in the side of the rock leads up to the opening of the cave, some hundred feet above the plain. An entrance of cut stone with carved figures is erected in front of the temple, a gloomy vault 170 feet long and seventy feet broad, and about

¹ Exodus.

² The most recent work on the rock-cut temples of India is that of Mr. Fergusson, F.R.S., 1864, which contains many photographs of them. He says, "None of these extraordinary works are as old as the reign of Asoka, the whole of them having been executed in the fourteen centuries which elapsed between the time of Dasaratha his grandson and the completion of those at Ellora in the twelfth century A.D.; there are supposed to be 1000 of these temples in India, most of them having been Buddhist, as the caves at Salsette and some of those at Ellora." An elaborate account of the Dambool temple will be found in Davy and Forbes's Ceylon, also in the Jour. A. S. of Bengal for 1847, xvi. 341, by Mr. Knighton, with a drawing of the rock, which is also in Tennent.

twenty feet high in front, the roof shelving downwards as it recedes until it reaches the floor; the interior is filled with long lines of statues of Buddha in the three orthodox attitudes, with a small dagoba in the centre. There is a resemblance in the arrangement of the statues and dagoba at Dambool with the pillars and dagoba in the Buddhist chaitya in the cave at Karli in India. The roof is covered with cotton cloths, and the walls are embellished with a series of villainous paintings representing the principal events of Buddhism in the island—the landing of Wijayo, the preaching of Mahindo, and the planting of the Bo-tree. Water drops through the rock in one place, where it is caught in a chattie and regarded as holy. Among the rest of the fabulous statements in the “Mahawanso,” it says Kirti Nissanga covered the walls with plates of silver, and the roof with tiles of gold.

The hill temple and dagoba on the top of the granite rock of Mihintala, 1026 feet above the plain below, is one of the most ancient sites of Buddhist worship in Ceylon, and where Mahindo is fabled to have alighted for the conversion of the island. Two hundred steps cut in the rock lead to the summit.

In India Buddhist remains take either the form of a tope, chaitya, or basilica, a vihara or monastery, but purely image temples were not known except in Kashmir and the north. If Sakya lived at the time stated by his followers, it appears no religious edifices connected with his worship were erected until several hundred years after his death. *Vide* Hodgson on “Buddhist Chaityas and Symbols,” J. A. S. Beng., xviii. 397.

Buddhist Priests.—One of the innovations of Sakya on the system of the Brahmins was to admit to his priesthood men of all castes, not even the lowest being excluded: a preliminary noviciate is required, and the usual age of ordination is twenty.

A number of vows are taken on becoming a priest, the chief being celibacy and poverty; a married man may become a priest, but it involves a divorce and separation while he is a priest; the vow of celibacy is not irrevocable, as he may leave the priesthood and marry again.

Becoming a priest is often a device for obtaining a divorce,

because when they make a profession of faith and assume the yellow robe, a marriage previously made is absolutely dissolved; then, after a time, they can throw off the robe and marry again. This practice is less common in Ceylon than other Buddhist countries. In Siam nearly every male becomes a priest some time of his life. The King every year shaves his head, wears a yellow robe for a month, and does penance.¹

The vow of poverty imposed on the priesthood is very strict; they live by begging in the neighbourhood of the temples to which they are attached. In accordance with this vow their robe of yellow cotton is cut into several pieces and sewn together again, in order to destroy the value of dress, as ordained by Buddha, his first followers probably covering themselves with a patchwork of rags which they picked up; their heads are closely shaven, and they usually carry a fan, to cover their faces when passing women on the road. One of Buddha's discourses says, "it is better for a priest to embrace the flame and be consumed than go near a woman." There do not appear to be many complaints against them for want of chastity in Ceylon. The Rev. Spence Hardy mentions witnessing an assault on one (by a number of native women with brooms) who was accused of some impropriety, and he was driven away from his temple.

Although Buddhist priests observe strict poverty as individuals, in a corporate capacity they can possess property; they are not a secular clergy, strictly speaking, being more akin to monks, and were endowed by successive kings to such an extent "they are supposed to have possessed one-third of the whole cultivated land in the island, and exempted from taxation, even long after British supremacy; but the value of their lands was much reduced by the abolition of Raja Karia and the destruction of the tanks."² A report on the lands held by them was made in 1831 by Colonel Colebroke.

¹ This account of Buddhist priests is partly taken from the Rev. Spence Hardy's "Eastern Monasticism," where the reader will find detailed and interesting particulars on this subject.

² Tennent.

It is remarkable that Fa-Hian makes no allusion to nuns, although, in the palmy days of Buddhism, they abounded in the island. The "Mahawanso,"¹ with its usual exaggeration, speaks of 90,000 "Théri" (158 B.C.), and describes with enthusiasm the admission of a Princess Anulá and five hundred virgin neophytes, clad in yellow, into the order, of which Sangha mittá, Mahindo's sister, seems to have been the chief Théri, "who died in the sixty-ninth year of her ordination."

In modern times there have been none of them in Ceylon, but they are found in Burmah, Siam, and China. Frequent mention is made by travellers of a personage called the Queen of Heaven among the Chinese, supposed to refer to the Virgin Mary; but the Rev. S. Hardy says this is not the case, as it refers to some female saint among themselves.

The property acquired by Buddhist confraternities in China has several times excited the cupidity of needy Emperors and their officials, and they have been secularized in the modern European fashion; but what seems a natural longing in many of the human race for this mode of life has led to their re-establishment under less unscrupulous rulers.

Sakya appears to have had a good deal of trouble with his monks and nuns in India. De Körös gives a translation of a code of laws or regulations for monks, 253 in number, all arising from some irregularity among them which led to each special enactment. Among his regulations we find an order prohibiting the seduction of nuns by the priests.² In the Rev. Messrs. Beal and Gogerly's translations of Sinhalese and Chinese versions of Buddhist ritual, there are very curious and minute regulations regarding the conduct to be observed by priests towards women, not to speak to, or sit near them, &c.³

Demonology.—The original worship of the island appears to have been tree and serpent worship, which is allied to demon worship, and more ancient than either Brahminism or Buddhism. In the mythical account of Sakya's visits to Ceylon, he

¹ Chap. xviii. 120-125.

² *Asin. Res.*, J. A. S. Beng., 1832, p. 430.

³ *J. R. A. S.*, xx. 54.

is represented as having converted the Nāga, or snake worshipping King of Kalany.¹

Snake worship is supposed to have been introduced into India from Egypt, where the votaries of the Isiac serpent thousands of years since were inspired with alternate hope and fear as they watched its languid movements on their altars. It existed in Egypt down to the fourth century, A.D. The Ophites introduced it into Rhodes, Greece, and Cyprus, and there are few countries where some trace of it cannot be found. It still exists in Southern India,² and the remains survive in Ceylon to the present day in the general dread the Sinhalese have of killing a cobra; indeed, until lately there was a temple at Jaffna dedicated to the goddess Nāga Tambiran, where they were carefully nurtured by a remnant of the ancient faith of the island.³ Snake worship, in common with demon worship, was no doubt originally inspired by fear, and is a traditional proof of the impression made on mankind by the events recorded of Eden. The Tamils look upon snakes as creatures of deep cunning, and they call a wicked man the seed of the serpent. That snake worship was very general in India is proved by the frequent mention of Nāga kingdoms there in the "Mahawanso," and the practice in Ceylon. Query, can the legend of St. Patrick driving all the reptiles out of Ireland refer to the early prevalence of snake worship, and really mean that he drove out or destroyed this practice in the island? Traces of tree worship still exist there in the habit of hanging bits of

¹ "Mahawanso," p. 5. There are remains of a monument at Bintenne, said to have been built in commemoration of Sakya's landing. Tree worship is found among aborigines in many parts of the world; the Tonga islanders lay offerings at the foot of certain trees inhabited by demons to propitiate them; the same practice prevails among the inhabitants of the Archipelago, and the North American Indians place offerings on stones for the spirits of the forest; the Negroes also worship sacred trees, offering food to local demons; in Sweden, mothers still smear with grease and present rag dolls to the elves of the woods on the old sacrificial stones to save their sick children, and formerly farms and abodes had sacred trees inhabited by a local demon or guardian spirit; bits of rag are hung on particular trees in Ashantee. "Bale" offerings to a yakkho are mentioned in the "Mahawanso," A. D. 246, p. 230.

² J. Fergusson, F. R. S., "Tree and Serpent Worship," p. 63—a sect of Gnostics called Ophites are said to have existed so late as the sixth century.

³ Casie Chitty, Ceylon branch R. A. S. J., 1847, p. 70.

rag on particular trees. In the "Report of the British Association" for 1871, p. 158, there is an account of the discovery of "a serpentine mound in Argyllshire, several hundred feet long, gradually tapering from head to tail; there were also evidences of altars and fire."

Demonology prevails to an extraordinary extent in Ceylon. Every village has its Kattadia, or devil-priest, who lives on the superstitious fears of the natives. A whole host of demons of every possible variety and description are supposed to infest the island, no place being free from their intrusion. Ceylon demonology resembles that found among the Tartars and Shannars of Southern India.¹ Their demons have no power over the souls of mankind, only injuring the body and delighting in human calamities, causing sickness both to man and beast; in fact, everything that goes wrong is attributed to them. Often women, imagining they are possessed of devils, run about half mad, tear their hair, gnash their teeth, and seem as if in a fit. Singhalese women appear to have a morbid propensity to this kind of thing, a sort of mania or hysteria. When any of them who are Christians become possessed of a devil, the sacristan is sent for, who brings a cross which is held before her, and some prayers repeated, while they drive the demon out of her by striking her back with the tail of a skate fish.

Children, when deformed at birth, are supposed to be demons, and destroyed; and numerous recipes are current among the natives for the manufacture of love potions, and charms. An almost incredible account of demonology, including the worship of the sun and stars, as it exists in the island, is given by M. De Silva, in the Ceylon branch of the Asiatic Society's Journal for 1865-6. Among the demons described is the "Black Prince," a very respectable demon, less savage than the rest of his fraternity. Rice cakes, king cocoa-nuts, sugar-canes, &c., are offered to him. He is always tormented by the passion of love. When his evil influence falls on women, they become ill. Fair young women are very liable to his attacks. He was originally a Buddhist priest of great

¹ Caldwell, Dravidian Grammar, Appen.

sanctity who could fly. On one occasion, while moving through the air, he fell in love with a princess whom he perceived below, when he lost his supernatural power and fell to the ground, which burst his heart, and he became a demon.

The most numerous of the demons are the Yakkhos, who inhabit particular groves or trees, and are supposed to sally out and frighten the passer by with dark shadows, trees thrown across the path, and noises. They are fond of living in old trees, especially ironwood, Bo, and belli-pata trees, growing near paths, wells, dewales, and graves. On this account the Singhalese seldom allow old trees to remain near their houses. Little offerings are attached to trees inhabited by these evil spirits to propitiate them. In gardens a particular fruit or other tree is selected and marked with a band of leaves to denote that it has been set apart or devoted to the demons of the locality to keep them quiet, after which its fruit is supposed to be sacred and cannot be touched, or a branch of the tree broken, although it is often the case that the demon is defrauded of his share, and the fruit carried off at night some time after the ceremony of putting it aside, under the plausible pretext that he does not want it. The demon thus patronised is supposed to act in return as a kind of local guardian, keeping off thieves, and preventing sickness among cattle.

It is also the custom to place part of the rice harvest on one side for the demon, in a part of the field arranged as a kind of bower, decorated with flowers of the *Pandanus odoratissimus* and olas. A stone is placed under the bower on which are put a few sheaves of grain, along with a piece of talipat-leaf, on which are written some mystical letters by a devil-priest.

When any of the natives are taken ill they dedicate a red cock chicken to the demon, and send for a Kattadia, who dresses himself up to personate the demon, and, after sundry contortions of his body, pretends that he is inspired, and declares to the patient and those around the nature of the disease, and the prospect of recovery. Sometimes a small altar is made in the chamber of the sick person, and the fowl sacrificed, but more often it is let loose among the rest after being dedicated to the demon, the priest saying if the patient recovers

the fowl becomes his property, and comes to claim it. In this way, as says Knox, "they go round about and fetch a great many cocks together."¹

The Kapua, or devil-dancers, are also resorted to in various emergencies. The hair of these half-frantic, glaring-eyed looking individuals is never cut, but allowed to grow an immense length, hanging about them in disarranged masses, and as they go through their frantic performances by torchlight—the time usually selected for dancing—they look perfectly demoniacal.

Sorcery and witchcraft are commonly believed in by all the natives, particularly the Tamils of the north, and astrologers (nakastrikaria) employed to calculate horoscopes at the birth of children, and predict marriages. "Sorcerers are usually doctors uniting the two professions, and are resorted to by men and women for all sorts of immoral purposes. Children's skulls are used in their incantations, and they profess to be able to procure the deaths of persons. The skull of a first-born male child that has been killed for the purpose is thought to be the best, and several cases have occurred in the north of the island where children have been made away with to obtain their skulls. Persons who wish for the death of another, obtain some of the intended victim's hair, and, if possible, some dust or sand from his feet; thus armed, they go to the sorcerer, who mixes them up in his presence with some of his saliva on a leaden plate, accompanied by various incantations, and mystical writings on bits of leaves, which are then placed in the skull, and the person departs, after paying the sorcerer, firmly persuaded that the object of his hate will soon come to an untimely end."² This roundabout way of getting rid of persons is not always followed, as they often employ the more direct process of secret poisoning.

Christianity in Ceylon.—St. Thomas, one of the twelve apostles, is said to have preached Christianity in India, and there are some legends that he was in Ceylon. The native

¹ The Hill Tribes of Garrow, N.E. of Bengal, are said to offer cocks in case of sickness, Asiatic Res., iii. 29. *Vide* M. Joinville in Asia. Res. vii.

² Tennent, Ceylon, ii. 547.

Christians in India are called St. Thomas Christians at the present day, and an Indian bishop was present at the Council of Nice (325 A.D.).

Dorotheus, Bishop of Tyre in the time of Constantine, says the eunuch of Candace,¹ Queen of Ethiopia, preached the gospel in Socotra and Taprobane. The inhabitants of Socotra were all Christians at an early period, and the island may have been visited by him on his way, but there is no proof that he was in either place.

Cosmas states that there was a Christian church in Ceylon (530 A.D.) for strangers who came there from Persia, from which it has been surmised that the Christians alluded to were Nestorians, who had planted their form of Christianity in Malabar before the sixth century. This is the only allusion to Christians in the island that can be found in any other traveller's narrative until the time of the Portuguese, except a statement in "Edrisi" that there were four Christians among the king's councillors.

In Chapter XIII. it is related how St. Francis Xavier was invited to Ceylon by the fishermen of Manaar, and the arrival about the same time of a party of Franciscans from Portugal, when many conversions were made and churches built, principally about Jaffna.

Baldæus, the Dutch minister,² who appears to have been quite free from the persecuting spirit of the majority of his countrymen at that time, bears honourable testimony to the success of the Catholic missionaries, and difficulties of the Protestants in making converts, which he attributed to the variety of forms among them, a difficulty which they experience to the present time.

¹ Acts, viii. 27. *Vide* ch. xxi. Col. Yule's *Polo*; Maffei, *His. Ind.*, iii. 61.

² He writes the following of St. F. Xavier: "Yet might his piety and other commendable virtues serve as an encouragement to all pious ministers to follow his footsteps in performing the service of God to the utmost of his power; it must be confessed on all hands that had not the active spirit of the Jesuits awakened the Franciscans and other religious orders from their drowsiness, the Roman Church had before this time been buried in ruins; and as for myself, I am very free to own that my pen is not capable of expressing the worth of so great a man."—Baldæus in *Chur. Coll. Voy.*, iii. 607. St. Francis Xavier died of fever in China in 1552.

No sooner had the Dutch got possession of the island than they commenced a system of persecution against the native Christians and Portuguese descendants, and put one Jesuit to death. This continued until they were expelled by the British, when all disabilities on account of religion were at once removed.

The native Catholic Christians are most numerous in the vicinity of Manaar; they are, however, not much to boast of; with few exceptions, their religion is a confused jumble of Christianity, Buddhism, and demon worship. Portuguese priests find that their converts, and even those born Christians, adhere to their old superstitions with tenacity, make offerings in Buddhist temples, and seek on all occasions to propitiate evil spirits.

Many of the Singhalese think it very desirable to belong to several religions at the same time, that, in their idea, being the safest plan, for in a multitude of counsellors there is security; they are not at all bigoted, being lazy and indifferent to any particular form of worship, provided they can only keep the devils quiet.

"The church of St. Ann at Calpentyne is much renowned in the island for miracles, and cures effected there, and many of the demon worshippers make offerings in it; even the Mahometans do the same, and think they are none the worse for paying honour to 'Hanna Bibi, or Mama,' as they call her."¹

There seems to be some softening influence in the air of Ceylon on the most bigoted and fanatical of Eastern religionists, who here give up a good deal of their virulence: one rarely or never hears in it of the fanatical scenes that occur among rival sects in India.

¹ Sir E. Tennent, Ceylon.

CHAPTER XXIV.

MAMMALIA.

THE majority of the animals of Ceylon which are common to India and other places, were described long ago by Linnæus, Buffon, Cuvier, and other naturalists, and the Dutch sent some specimens from the island which found their way into European museums, but the first general account of its zoology is that of Sir E. Tennent, published in 1861.

Dr. Davy had previously given a scientific account of some of the snakes, and Dr. Kelaart in 1852, published at Colombo his "*Prodromus Fauna Zeylanica*," giving descriptions of many species previously unknown. Dr. Templeton, R.A., and E. L. Layard, C.C.S., also devoted much of their time to a scientific investigation of the fauna, obtaining the valuable assistance of Mr. Blyth, the curator of the Calcutta Museum, in the identification of the specimens they submitted to him. The result of their researches, together with interesting accounts of the habits of the animals, birds, &c., are given in various numbers of the "*Journal of the Asiatic Society of Bengal*," "*The Annals of Natural History*," and "*Proceedings of the Zoological Society*." In this enumeration the name of Robert Knox, Singha's captive, should not be omitted, who so faithfully described many of the animals, especially the monkeys.

Since 1861, many new species have been discovered in the island, and are described by Drs. Gunther and Grey, and other persons interested in natural history, in the periodicals mentioned.

The question raised by Sir E. Tennent, of the dissimilarity between the fauna of Ceylon and the adjoining peninsula,

having been discussed in Chapter III. of this work, it is only necessary to mention here a few additional particulars on the subject. The difference between the fauna of the Australian and Asian regions, separated by the Straits of Lombok, is more remarkable than that between Ceylon and India; again the bintag (*Bos Sondicus*) is found all through Malay, Burmah, and Java, but not in Sumatra.¹ With regard to the absence of Indian animals in Ceylon, there is no doubt changes occur, some disappearing from places where they were abundant, while others become naturalized. There are no elephants in the Philippines at present, but Sir J. Bowring² has shown they must have been there formerly, while this animal, though now wild in Borneo, is said not to be indigenous, having been, according to Magelhaen, brought there from India. As a general rule, species of all kinds which inhabit islands are few in number compared to continents.³

The fauna of the island has a greater resemblance to that of Southern India, especially the hills, than any other place. The zoology of the Nilgherries and Newera-Ellia are almost identical; birds are found in Malabar, the Nilgherries, and Ceylon unknown in other parts of India. There is no doubt a considerable difference between Ceylon and India taken as a whole, but not much more than between parts of the peninsula. There does not appear to be a greater resemblance between the faunas of Ceylon and Sumatra, than between India and Sumatra, for although many Malay and Sumatra species are found in Ceylon and not in India, quite as many, if not more, Malay and Sumatra species are found in India and not in Ceylon, of which a long list might be made; for instance, the Malayan bear (*Ursus Malayensis* ⁴), several species of Viverra, the wild dog of Malay, some monkeys, a dragon, and a baboon, *Hylobates agilis*, Cuv., in addition to those mentioned in Chapter III. There is a marked difference between the fauna of the hills and plains of Ceylon; it is in the hills that nearly all

¹ Murray, Geog. Dis. of Mamm., p. 142.

² Visit to the Philippines.

³ Darwin, "Origin of Species," pp. 468-470.

⁴ Horsfield, Catalogue of Mammalia, E. I. Comp. Mus., p. 123.

the species peculiar to the island are to be found, particularly among the birds, also the horned lizards, the lyre-headed lizards, two of the viverra, some of the ground snakes, and one of the monkeys, even the species of the plains undergo a change in the hills, where *Papilio crino* differs so much from that of the coast, that it is proposed to call it *P. montanus*.

Recent discoveries have widely extended the geographical affinities of some of the Ceylon fauna: an *Arius* has been found identical with that of South America, and others closely allied to those found in the tropical parts of Australia and Africa, where also one of the *Tropidonotus* and an *Acontias* have been discovered. Several species of land and fresh water shells from the higher mountain regions of the island, correspond with those of Darjeeling, the Nilgherries, Southern India, South America, Africa, and Oceania.

Periophthalmus and *Mastacembelus* have been noticed on the west coast of Africa: the *Ambassis thermalis* and *Perca argenta* in the Mozambique fresh waters. A connection with the Mammalian fauna of the Comoro isles is shown in the *Viverricula malaccensis*; with the Avi-fauna of the Seychelles, in two varieties of *Zosterops*, *Palæornis Alexandrii*, a *Hypsipetes* and *Tinnunculus*; with that of Madagascar, in *Pteropus Edwardsii*, *Drymoica*, *Merops*, *Alcedo*, *Tchitrea*, *Hypsipetes*, *Dicrurus*, *Pratincola*, *Eurystomus*, *Saxicola*, *Zosterops*, *Ardea*, *Acherona*, *Trigonodes*, and *Gasteracantha*: some of these forms are similar and others closely allied.¹

With respect to the alleged difference between the elephant of India and Ceylon, and resemblance of the latter to that of Sumatra, Temminck, in his "Coup-d'œil sur les Possessions Néerlandaises," and Professor Schlegel, a Dutch naturalist, were the first who started the idea, the latter obtaining in 1845 some elephants' skeletons from Sumatra, which he found on examination to differ from those of Bengal, chiefly in the dorsal vertebræ, that of Sumatra containing twenty, while those of India had only nineteen, and the African twenty-one; however, he suggested that perhaps all Indian elephants were

¹ Proc. Zoo. Soc., 1865, 1867, p. 103, 345.

not of the same species, and some might yet be discovered in unexplored parts, differing from those of Bengal.¹

Dr. Falconer took up the subject, and ascertained on comparing skeletons of *Elephas indicus* in various parts of Bengal, that their ribs varied from nineteen to twenty, and in African species from twenty to twenty-one, so that there is no fixed rule on this point. The number of true ribs is the same in all the species, being only five on each side, the remainder are false. Specimens of the three elephants are found in museums with twenty dorsal vertebræ in each, and it is very probable that some might be obtained from Ceylon with a different number of vertebræ, as the Sinhalese distinguish a difference among them, calling some "high caste," and others "low caste;" according to them, high caste elephants have twenty nails on their four feet, five on each, and low caste only eighteen; the nails of Indian elephants also vary, those of the Saul Forest have sometimes five nails on their hind feet, the African has only three. Mr. Hodgson in 1832, speaking of elephants, remarked, "It may be questioned if there be not two distinct species in India, viz., the Ceylon, and that of the Saul Forest, the former differing materially from the latter in having a smaller head."²

Professor Schlegel, on the authority of Herr Diard, a naturalist who visited Ceylon a few years ago, makes some remarks about the superior intelligence of Ceylon elephants, an idea as old as Cosmas; but Mr. Blyth, who had ample opportunities of observing both species in India, says, "he could see no difference between them in this respect."³ A very fine and perfect skeleton of an elephant captured in a kraal during the visit of his Royal Highness the Duke of Edinburgh to Ceylon, is now in the museum at Oxford along with some Veddahs' skulls.

¹ Professor Schlegel's paper was read before the Dutch Academy of Sciences in 1861, and afterwards translated in the Nat. Hist. Rev., 1862, p. 81. Vide also Tennent, Nat. Hist. Ceylon, p. 69; Temminck, pp. 91, 328; Owen on Limbs, ii. 437.

² J. A. S. Beng., 1832, p. 343.

³ *Idem*, 1862, p. 169.

Dr. Gunther, in his work on "The Reptiles of British India," says, "Ceylon is the centre, as it were, of a zoological province (including Southern India), from which a number of peculiar forms radiate, but while some do not reach beyond the limits of the island, others extend more or less into the peninsula. . . . One of the most characteristic features in the reptile fauna of Ceylon, is the total absence of affinity with Archipelago types, as far as tortoises, saurians, and ophidians are concerned; there are no dragons, no callophidias, no calamaria. Whilst a comparison of its batrachia with those of the Archipelago does not show a greater diversity than one or two species. A connection with the African fauna is shown by the presence of *Acontiadidae* and a species of chameleon. . . . Characteristic forms which extend over to the peninsula, but not beyond, are *Testudo elegans*, *Emys trijuga*, *Salca*, *Cynophis*, *Hypnale*, *Daboia*, and *Cyclophis calamaria*, intermixed with others peculiar . . . those whose affinity is African are strangers, *Chameleo* is more frequent in India than Ceylon, and a dragon, *Draco Dussumieri*, is found on the western coast of India."¹

Since this was published, some of the reptiles enumerated as peculiar have been found elsewhere, for instance *Cynophis* in Borneo;² *Daboia elegans*³ or the Tic polonga, is by no means confined to Ceylon and the Indian peninsula, being found in Burmah; *Hydrosaurus salvator* is a remarkable example of the affinity between the Saurians of Ceylon and the Archipelago,⁴ while fourteen new and peculiar species of Batrachia have been discovered.

There is a tendency in the fauna of Ceylon to changes of colour, so much so, that specimens of the same species have been mistaken for new forms, for instance in monkeys, bats, squirrels, and birds; and this should be borne in mind when specimens appear to differ from descriptions.

¹ Page 1, ed. 1864.

² P. Z. S., 1867, 1869, p. 501.

³ Fayrer, Thanatophideæ of Ind., p. 32; Theobald, Burmah Reptiles; J. Linn. Soc., 1870-4; Gray, Lizards, p. 171, ed. 1845.

⁴ Cantor, Catalogue Malay Rep., P. Z. S., 1860, pp. 113, 164; Ann. Nat. Hist., 1868, p. 152, 1872, p. 35.

QUADRUMANA.—*Monkeys*.—Only two genera of monkeys have been found in the island, one called “Presbytes,”¹ by Eschott, from their white whiskers giving them a venerable appearance, a species of baboon nearly allied to Gibbons, which presents four varieties, and the *Macacus*, of which there is only one variety.

The most numerous of the Presbytes is the “kalu-wanderoo,” or black wanderoo of the natives, *P. cephalopterus*, found in the lower country, being rarely seen in the higher hills. This species, which is twenty inches long, is the darkest of the Presbytes, having blackish fur rufescent about the head, with white beard and whiskers, and accurately described by Knox as being of a “dark grey colour, with black faces and great white beards round from ear to ear, which makes them show just like old men; they do little mischief, keeping in the woods, eating only leaves and buds of trees,—this sort they call “wanderoo” (p. 107). The crested, or “konde-wanderoo” of the natives (*P. priamus*), is something larger than the preceding, with paler fur, having a brownish tinge and buffish whiskers; it is distinguished by a thick crest of hair on the top of the head. They are very common in the north and eastern provinces, and more familiar in their habits than other wanderoo, stealing fruit in gardens and palmyra topes, and are said to be vicious, attacking and biting native children who come in their way.²

The Maha, or great wanderoo of the Sinhalese, is a very distinct short-armed species, only found in the mountain districts, and is the largest in the island, being ordinarily about twenty-five inches long, and some are found much larger. Mr. Blyth named them *P. ursinus*, from their resemblance to a bear when on the ground, and considered they are very like the Himalaya lunger (*P. schistaceus*), and not unlike *P. Johnii* of the Nilgris. Their fur is a dark grey with white whiskers, black hands, feet, and tail. This was evidently the species

¹ Semnopithecus, Cuv. Wanderoo is a corruption of Ouanderou, a general term given by the Sinhalese to all the Presbytes in the island, distinguishing each variety by a prefix.

² Sir E. Tennent says, “The Ceylon wanderoo, *P. cephalopterus*, Zimm., was confounded by Buffon and other naturalists with a large and repulsive-looking monkey of the Malabar coast, *Silenus veter*, Linn. from the circumstance of its also having a large white beard. The wanderoo was first described by Zim-

mentioned by Knox "as large as spaniel dogs," although his description of the wanderoos appears to be more general than particular, from his residence in the mountains he could have hardly failed seeing this variety.

P. Thersites.—The "Elli," or grey wanderoo, has greyer fur and larger and whiter whiskers than the other three varieties, and no crest; they are rather rare, and chiefly found in lower central regions. This and the Maha wanderoo are peculiar to Ceylon; the others are found in Southern India.

Dr. Kelaart has sought to establish a new species of Presbytes (*P. albino*) a very pale, or almost white monkey, being found about Dombera and Kurnegalle; they are too numerous to be albinos, besides their eyes and face are black, and present all the characteristics of a pale variety of *P. Thersites*, which they probably are, particularly from both being found in the same neighbourhood, or they may be a variety of *P. cephalopterus*, which Dr. Blyth says is a variable species in the colour of its fur; he has met with old males in India whose whiskers were brown.

Knox mentions them; but he says both body and face were white, which would imply that those he saw were albinos.¹ Pliny alludes to white monkeys in India (viii. 80).

All the wanderoos live on fruits and plants, and are gregarious, wandering about in large parties through the jungles, the trees in some places being alive with them, and are very numerous at times about Newera-Ellia. They are not often seen on the

merman under the name of *Leucoprymnus cephalopterus*, and then by Mr. Bennet as *Sennopithecus Nestor*, P. Z. S., 1833, p. 67. Eleven years after, Dr. Templeton sent a drawing and description of one; when Mr. Waterhouse at the meeting of the same Society in 1844 identified it as Bennet's *S. Nestor*. *S. veter* is not a Ceylon species, and only found in the island in the possession of Arab horse-dealers, who bring them from India."—Nat. Hist. In Horsfield's Catalogue, 1851, p. 22, *S. veter* is said to be from Ceylon, but Dr. Kelaart only recognises the four species already mentioned. It is not clear how the Sinhalese name wanderoo came to be applied to the animal figured in Buffon, unless it was supposed to represent the one named by Knox; but it is not improbable that some specimens sent from Ceylon by the Dutch may have been seen by the great naturalist. Linnaeus describes two white-bearded monkeys, one being named Ouanderou.—Cuv. Dic. v. 24, 234; Buffon, v. 35, 273; Linn. v. 10, 26.

¹ Kelaart, pp. 5, 7; Knox, p. 25; Aristotle, H. A., 11, 13.

ground, where they are cautious and out of their element, flying at once to the trees when surprised or alarmed; it is very amusing to watch their gambols in the trees, accompanied by a loud hooting noise, and see the surprising leaps the mothers can make from branch to branch with the little ones hanging round their waists. * They are sometimes hawked about Colombo in wooden cages for sale by the natives, but though so active and lively in the woods, they are stupid and melancholy in captivity, and do not live long in this state. Dr. Kelaart says all the hill monkeys die of decline at Colombo,¹ which was also the case with a young ouran-outang from Borneo, belonging to a doctor. It is curious that the "hanuman" of the Hindus (*S. entellus*) found all over India from the extreme South to the North, should not be in Ceylon. These were the monkeys fabled to have been employed by Rāma in building Adam's bridge. *P. Priamus* is the small-crested hanuman of India.

The rilawa of the Sinhalese, *Macacus pileatus*, a species of bonneted macaque, is a lively little brown monkey having no beard, but a smooth pale face and a tuft of hair on the top of the head. They are very numerous in most parts of the island and southern India, and as Knox says, "come into gardens and do mischief," frequenting the neighbourhood of hamlets to steal the fruit. Unlike the wanderoo, these brown monkeys bear captivity very well, but are passionate and revengeful, and bite severely; if you go through the pretence of beating a person who has annoyed them they dance and scream with delight, their faces turning quite white. Numbers of them are taken on board ship for England by sailors, but very few survive the passage round the Cape, especially in the winter, as they suffer much from cold. In one instance an old female who lost her young assumed the maternal charge of several small ones that did not belong to her, and kept them in very good order, slapping them on the face whenever she was annoyed by them. They spent most of their time along with the pigs under the long boat for the sake of their warmth.

¹ Blyth, J. A. S. Beng., xiii. 470, xvi. 732, xi. 891; 1843, p. 175; 1852, p. 344.

Monkeys in a wild state are much fascinated at the sight of a dog; in the palmyra topes of Jaffna, where they do great mischief, they often fall victims to their curiosity to watch its movements.

A substance called bezoar, composed of phosphate of lime, is sometimes found in the stomachs of monkeys (*vide* ch. xxii.) It is a popular idea in India and Ceylon that a dead monkey is never seen. The story, according to one version, runs thus: "Any one who sees a dead monkey, a straight coco a-nut tree, or a paddy bird's (*Ardeola leucoptera*) nest, will live for ever."¹

The loris (*L. gracilis*) "*oona happolava*" of the Sinhalese, is a species of sloth, a little nocturnal animal, eight inches long, allied to the monkey and lemur, a very uninviting-looking creature, with owl-like eyes, stealthy and sluggish in its movements, spending the principal part of its time sleeping, rolled up like a ball, with its head between its legs. They will eat anything offered them—meat, fruit, milk, beetles, &c., but do not live long in captivity.

There are two varieties in the island, one rather common, of a brown colour, and a larger variety with black fur, *Nycticibus Ceylonicus*, which is rare; it is doubtful if they are distinct species, and are only found in the lower country. The loris are remarkable for an extraordinary meagreness of body and limb, and are strictly arboreal animals, preying on birds at night. Their movements are almost imperceptible, paw after paw is silently advanced along a branch until within reach of its victim, when it is seized by the neck with the rapidity of lightning, and their grasp is so tenacious they never let go. The natives say, although so small, they can kill a peacock, but only eat their brains; they also prey on lizards and suck birds' eggs.

CHEILOPTERA.—As soon as the sun sets a multitude of bats fill the air, many entering the open rooms and seizing flies. There are about twenty species, including the large fruit-eating section, the majority preying on insects. They are of various sizes and shades of colour, from a muddy brown to the rich orange or red of the painted bats; it has been remarked by

¹ Buchanan's "Bhagalpor," p. 142, quoted by Sir E. Tennent. *Vide* ch. xxxii.

Geoff. St. Hilaire that the colours of bats become brighter as they approach the equator, accounting for the vivid hues of some Ceylon bats, which has made many suppose they were a different species from those of India.¹

The term Cheiroptera applied to the bat family is derived from the Greek, meaning winged hands. Spallanzani ascertained by a number of cruel experiments that they are endowed with a strange perception of the vicinity of another body, which enables them, even when deprived of sight, hearing, and smell, to direct their flight with marvellous accuracy, avoiding the threads he suspended to intercept them in this state, but the seat of this power was not known until Cuvier demonstrated that it lay in the wings, which possess an extraordinary degree of sensitiveness. Dr. E. Schöbe, of Prague, has recently ascertained that what Cuvier took for nerves in the wings are elastic trabeculæ.² Bats are thought to be deficient in the power of sight possessed by other nocturns, which enables them to see clearly in the gloom of night, and doubtless if such is the case, this strange faculty supplies the deficiency.

Their largely-developed ears are also supposed to aid them in giving a more acute sense of hearing, and the strange nasal leaflets on the extremity of the nose of some, a more intense power of smell, but the latter appears to be only an idea, as it is not explained why some bats have them and others not.

It has not been ascertained if the large variety of Cheiroptera, named *Pteropus*, possess the same sensitiveness in their wings as the smaller bats experimented on, which is doubtful, as their organs of sight do not appear to be defective.

Horsfield has ascertained that in India the larger bats prey on the smaller *Vespertilio*, sucking their blood from an incision they make behind the ear, and afterwards devouring their victim, previously voiding the blood extracted, which in some measure substantiates the statements of Steadman and others respecting the South-American vampire (*V. spectrum*). The *Megaderma lyra* is also quite omnivorous, eating frogs, fish, and

¹ Blyth in Kelaart, *Fau. Zey.*, p. 40; *Naturalists' Lib.*, ii. 113.

² Quoted in "Nature," Nov. 1869.

beetles.¹ This savage propensity does not appear to have been ever noticed in any of the bats of Ceylon, but it has been remarked that the males and females are never seen in the same locality except at certain times of the year, a peculiarity common to bats everywhere—none of them hibernate, as in Europe, being in an active state all the year, and have generally a very disagreeable odour about them, strongly developed in the *Pteropus*.

Pteropus.—There are two varieties of flying-fox, as they are called by the Europeans, from the great resemblance their heads bear to a fox. The largest, “loco-voulha” of the natives *P. Edwardsii*, Geoff., attains a considerable size, some specimens measuring from three to four or even five feet with wings expanded; the body and head are covered with a short tawny-brown hair, but the wings have none except a little on the outer parts, and have the appearance of parchment stretched on a frame. They have no legs, strictly speaking, the body terminating in two limbs connected with the wings, ending in something between the hand of a monkey and the claw of a bird. They consequently can only fly or hang in a pensive position with the head down. Nocturnal in their habits they spend the day in a state of semi-torpor suspended from the branches of trees in shady retreats, congregating in some localities in great numbers. In the eastern province they are found roosting along with herons and other birds of that description. Sir E. Tennent mentions that “they swarm in the Peradenia gardens like bees, breaking the branches of the trees from their weight,” but, generally speaking, they are rare in the mountain districts. After sunset they take wing with slow movement and strange barking noise, to eat fruit, on which they chiefly live. When thus engaged they are quarrelsome, fighting and biting each other, with loud screaming. During the time of toddy drawing they frequent the palm trees to drink the sweet liquid, a habit that has also been remarked by the natives of the Maldives. Their flesh is said to be eaten by the half-caste Portuguese in India.

Dr. Bennet, in the “P. Z. S.” for 1863, mentions an instance

¹ Page 31. *Vide* also Blyth on Carnivorous Bats, J. A. S. Beng. 1842, p. 255.

of fish-catching on the part of the flying-fox¹, which, as he remarks, does not seem to have ever been noticed by any other observer of their habits: "At Chingleput, in India, about six p.m. in April, there was a slight shower and a number of small fish were gamboling in the water of a tank, when several flying-foxes hovering over it seized the fish in their claws and flew off with them to a tamarind tree on the bund of the tank to devour them at their leisure;" this proceeding was repeated on several evenings.

Bats.—The largest in the island is *H. insigna*, measuring 21 inches expanse of wing: margin and red-eared bats, coleekan voulah of the Sinhalese, are very common, and the long-armed species (*Taphozous longimanus*) rare.¹ Some of the *Scotophilus* genus are remarkable for their very small size; one of them (*S. Coromandelicus*) is a tiny familiar animal of a deep black colour, common about Colombo.

The painted bat, kehel voulha of the natives (*Kerivoula picta*) is common among plantain trees, eating the fruit. Some of them are covered with citron or red markings on a dark ground of brownish crimson.

A golden-yellow *Hipposideros* (*H. aureus* of Kelaart)², submitted by him to Mr. Blyth as a new species, turned out to be a variety of *H. Speoris* of India, where it is a dusky-black colour. The tints of Ceylon bats vary considerably, even in the same species; some of *H. murinus* have been found quite black, and others a bright yellow-brown.³

CARNIVORA.—*Shrews*.—Two or three species peculiar to the island have been found in the mountains. One, *F. macropus*, Kelaart, is a water-shrew of large size and uniform bluish colour. *S. montanus* is very small and black. Mr. Blyth considers them to be new and distinct species. The common musk shrew or musk rat of India (*S. indicus*) is one of the nuisances of Ceylon, as they frequently enter houses and rooms, immediately impregnating the whole apartment with a detestable odour, which comes from a liquid secreted in sebaceous glands on

¹ Blyth, J. A. S. Beng. xvii. 252. The flying-fox is also called Roussette.

² Blyth in Kelaart Appen. ; also J. A. S. Beng. (1852-5).

the flank of both male and female, and supposed to be only developed at particular times.

Bears.—There is only one species found in the island: the southern India bear (*Prochilus labiatus*), a very uncouth-looking animal, with deep black fur, named "Oosa" by the natives; they are not often seen in the higher mountains, being most numerous in the northern districts, and are said to live chiefly on fruits varied with ants and wild honey found in the hollows of trees.

Pliny says bears like being stung by bees, as it relieves their heads like drawing blood (viii. 54). According to Colonel Sykes the Indian bear is not a vegetarian: a tame one he had preferred roast mutton and milk to all other food.¹

Sir Samuel Baker, who has had some experience of the wild animals of Ceylon, says "the bear is a very savage brute, and will attack any person he encounters at once."² No doubt they are fierce and formidable opponents to venture near, and many natives can show the white scars left from encounters with them. Some years since, when they were more numerous than at present, they occasionally molested post-office runners (who travel at night), in the Putlam district. The natives use charms against them, as they do for everything they are afraid of, but, as may be imagined, without much effect. "A European sportsman saved the life of a Moor by killing a pursuing bear which the Moor had approached too near from over-confidence in his charms."³ According to the natives the old bears carry their young on their backs.

During a great drought which occurred in 1849, the wells in the Carretechy district⁴ were so frequented by bears in search of water that the women were afraid to go near them. Several of the animals were found to have fallen in. Bears are said to damage sugar plantations in India, eating the canes when they ripen.

The following return of the number of wild animals killed in the island from 1854 to 1863 is taken from the reports of

¹ J. A. S. Beng., 1832.

² "Rifle and Hound," p. 199.

³ Tennent, Nat. Hist.

⁴ Layard, Ann. Nat. Hist., 1852, p. 337.

the Governor in the Blue Books 1866 (vol. lxxviii). • A reward of 5s. was paid by Government for each :—

	Panthers.	Bears.
Jaffna	138	244
Manaar	7	110
Wanny	138	334
Newera kalany	190	321
	<hr/> 473	<hr/> 1009

Jackals (Canis aureus).—These animals are common in most eastern countries. The English name for them appears to be derived from the Arabian “chathal;” they are chiefly nocturnal in their habits—hunting hares and small deer in packs at night, accompanied by a loud and hideous yelling. The howling of a pack of jackals in the stillness of night has something appalling in it. “In India they hang about camps, sneaking into the tents at night and stealing the soldier’s boots, being a bold and impudent animal.”¹ The Sinhalese call them “nareeah,” and are something between a fox and a dog in appearance, having reddish brown fur mixed with black; the tail ends in a black bushy tuft. The leader or oldest animal in a pack has sometimes a small bony protuberance growing out of the back of the head covered with a horny tuft of hair, which is considered by the natives as a kind of talisman and to keep off thieves.² The same idea exists among the natives in Bengal, who think the possessor of one of these horns is sure of success in every undertaking.³ Jackals are common all over the island, particularly in the north; those of the interior have greyer fur than their brethren on the coast.

The jackal is supposed to be the animal so often mentioned in the Bible, where it is called a “fox,” and are considered in the East to be quite as artful. Pliny mentions it under the name of “Thos,” an animal resembling a wolf, living by the chase, but never attacking man” (lib. viii. 52).

¹ Jerdan.

² Tennent, Nat. Hist. Ceylon. A jackal’s skull with a horn is in the College of Surgeons, London.

³ Torrens, P. Z. S., 1855, p. 131.

Pariah dogs.—This is the Sinhalese or rather Indian name for what are called “curs” in England, meaning literally a “low-caste dog,” who swarm in all the bazaars and hamlets of the natives, and seem to be a near relation of the jackal, living on any garbage they can pick up in the streets. These wretched, mangy, half-starved animals, who apparently have no masters, are one of the anomalies of Eastern countries, being found in every town and village from Constantinople to Calcutta. Various plans have been tried by the Government in Ceylon to abate the nuisance, but without effect. The insurrection of 1848 was partly caused by a tax imposed on them. “At one time a reward was offered for every dog killed, but it was found this only increased their numbers, for the horse-keepers and others bred them on purpose in order to kill them afterwards for the sake of the reward.”¹

European species of dogs do not thrive in Ceylon, particularly on the coasts, where those imported speedily die of liver and other complaints.

Viverra.—The Indian genet (*Viverricula malaccensis*) “ooralawa” of the natives, is a musk-yielding animal, about 30 inches long, of a grey-brown, with dark streaky spots, and seven or eight black rings on the tail. They are great destroyers of poultry, and numerous in the north, where they are kept in cages for the sake of their musk, which is an unctuous secretion contained in an anal pouch formed by a fold of the skin. Europeans in the island call them civet cats, but they are another species found in Africa, distinguished by black stripes instead of spots.

The palm or toddy cat (*Paradoxurus typus*), “oogoodova” of the Sinhalese, is common all over India and Ceylon where palms grow, spending the day asleep in the heads of these trees, descending at night to prowl about hen-roosts and kill poultry. This species is a dark brown or black colour; a golden-furred variety (*P. aureus*), is peculiar to Ceylon. Although a carnivorous animal and particularly fond of birds, the palm-cat will live for months in captivity on vegetable food.

Three species of mongoos are found in the mountains about

¹ Tennent.

Newera-Ellia, who are chiefly frugivorous and arboreal in their habits.¹ One of them, called the Ceylon badger by the Europeans on account of its bushy brown fur, and "loco moogata" by the natives, is the streaked mongoos, (*H. viticollis*) of southern India. *H. flaveus*, Kelaart, has a rich orange-brown fur, and *H. rubiginosus* deep red. According to Mr. Blyth,² both have been found by Elliot in southern India; while Dr. Gray in his classification of the Viverra (P. Z. S. 1864), makes them peculiar to Ceylon. He also says the animal known as *Viverra indica*, supposed to have been a distinct species, is now considered to be identical, or at least only a variety of *V. rasse*, Hodgs. of Java, *Viverricula malaccensis*, Gray. Dr. Peters says it is the same animal as the tunga of the Comoro Isles, and that the Mammalian fauna of these islands agrees more with that of India than Africa.³

Kellaart's *H. flaveus* was described by Dr. Gray, under the name of *Cynictes McCarthii*, in P. Z. S., 1851, and his *H. rubiginosus* as *Calictes Smithii*, and *H. Smithii*, Ann. Nat. His. 1855, living specimens of them being then in the Zoological Gardens, London, brought from the north and centre of Ceylon.

The most interesting of all the Viverra is the celebrated ichneumon, or grey mongoos (*Herpestes griseus*), so remarkable for its enmity to snakes. This brave little agile animal, which has some resemblance to a weasel, is of a dark grey colour, with a very bushy tail and a long, flexible body. When a mongoos and a cobra are placed in an empty room both seem unwilling to commence the fray, and, generally speaking, the snake is the most afraid of the two, making every effort to escape. At length the mongoos commences by making a series of feints to weary and distract the snake, until an opportunity presents itself to make a sudden spring at the head or neck and give it a good bite. This mode of attack is repeated until the snake is worried to death. Sometimes the mongoos get bitten in their encounters, but a few scratches do not affect them. It has been supposed that these animals have some

¹ Kelaart, Fau. Zey., p. 43.

² J. A. S. Beng., 1851, 1852.

³ Riese, Nach. Moss., p. 13.

property in their blood which renders them proof against the poison so fatal to others, and to some extent the mongoos does appear to be less susceptible to the poison than other animals of the same size, a property also possessed by cats in a lesser degree; but the experiments of Dr. Fayrer show that the real bite of a cobra can be as fatal to a mongoos as any other animal, in one instance dying within thirty minutes after being bitten. The quantity of long hair on their bodies may at times protect them, in preventing the poison from the snake's fangs being conveyed into the wound.¹

Although very courageous, there is no doubt the mongoos has an instinctive dread of the fangs of a cobra, which is apparent to any person who has seen these encounters, and the cunning displayed in their modes of attack to avoid being bitten. This was remarked by the ancients, who represent the ichneumon as adopting various devices to render itself proof against the fatal power of snakes. Pliny says this animal plunges itself into mud, and when well coated and hardened goes to the combat, raising its tail;² and Ælian and Lucan also describe it as diverting the attention of the reptile by the motion of its tail.

"Aspidas ut Pharias caudâ solertior hostis,

Ludit, et iratas incertâ provocat umbra."—Phars. iv. 720.

The *Aspis* of the ancients is supposed to be the *Naja-haji* of the modern Egyptians, a variety of the cobra; and the ichneumon was one of the sacred animals of ancient Egypt. Pliny represents various birds, lizards, and the tortoise, as eating certain plants, antidotes to snake bites, which is also a modern idea. Rumphius positively states that the mongoos eats some of the *Ophiorhiza mongoos* before an encounter, or after being bitten, and several other plants have been named in connection with them, but there is no authentic case of their ever having been seen in the act of eating any of them. Some natives say the mongoos does eat a plant, while many reject the idea (*vide* ch. xxvi). "The mongoos is an inquisitive little animal when let loose about premises, poking its nose into every hole and

¹ "Thanatophidæ of India," ed. 1872, p. 30.

² viii. 24, 35, 36; Ælian. lib. iii. 22, iv. 49.

corner, and a famous killer of rats. Mr. Bennet says a grey mongoos in the Tower menagerie killed in a room twelve rats in one minute and a half."¹

Leopards.—The *Felis pardus*, "cooteah" of the Sinhalese, variously called panther, leopard, and cheetah, by the Europeans, is the true leopard, and the largest of the feline family found in the island. As every person knows, they are distinguished from the tiger by a spotted instead of striped skin. Their usual height is twenty-eight inches, and they are about three feet and a half long, the tail being something less.

It has long been supposed that there is a distinct species of leopard with a black skin, *F. melas*, leopards of that colour being occasionally, though rarely, found in several countries; but it is now certain that there is only one species of panther or leopard, varieties in size and colour being merely accidental. Black cubs have been found in litters in India, the rest being the usual colour, and a specimen was sent from Bangalore in 1867 to England, whose portrait was given in the "Illustrated London News," February 8th, 1868. Temminck says a black cub was found along with others in a panther's den in Java.

Knox speaks of one he called a "black tyger," having been found in Ceylon, and one was shot at Badulla some years since by an officer, the Kandyan saying that only one other had been seen in their time.² Sir S. Baker says there are two species of leopards in Ceylon, one of which he implies to be the cheetah, or hunting leopard of India, (*F. jubata*), which is certainly not found in the island, the variations he speaks of in size and colour being natural to the panther. The natives say they are of two sizes. Humboldt,³ and some other writers, have incorrectly placed the tiger in Ceylon.

Leopards are very expert in climbing trees, commonly spending the day asleep among the lower branches, and prey very much on monkeys, and kill bullocks and other animals belonging to the natives, but are cowardly in their natures,

¹ Horsfield's *Cata.*, p. 106.

² MacMaster's "Notes to Jerdon's *Mammals of India*;" Horsfield's *Cata.*; Col. Yule's *Marco Polo*, ii. 317; Kelaart, p. 46.

³ Edition of 1843, p. 340.

shrinking from the sight of man, whom they very rarely attack, and a large hound is a match for many of them, although small dogs are often victimised. They are very numerous in most parts of the interior, forty or fifty being killed every year with spring guns, and caught in traps, when they return to eat the remains of the bullocks they carry off.

Pliny says panthers were sacred to Bacchus, from their supposed love of wine (lib. viii. 17). It is a popular error to suppose that they cannot retract their claws.

A tiger-cat, *F. viverrinus*, with black stripes, and a red spotted wild cat, *F. affinis*, resembling a lynx, are both common in the lower country. E. W. Holdsworth, F.Z.S., in the P. Z. S., 1872, describes a newly discovered variety of the red cat, similar to *F. Jerdonii*, of Southern India (P. Z. S., 1863).

RODENTIA.—*Squirrels*.—These lively little animals are found in all parts of the island, making the jungles echo in the mornings with their shrill cry, as they bound among the branches or run up the trees, signaling to each other the appearance of wild cats, who prey on them. The natives call them “rookaali.”

Naturalists find squirrels very difficult to distinguish from each other, on account of the general similarity which exists among them, and the variation in specimens of the same kind.

There are fewer varieties of species in Ceylon than in India. Some have been added to the list since Sir E. Tennent's book was published. The large black variety, named after him *S. Tennentii*, according to Dr. Gray's¹ arrangement of Asiatic squirrels, is not a peculiar species, but only a variety of the common very dark brown rock squirrel, found in the western parts of the island, which is subject to changes of colour, some being black or grizzled. However, there is some reason to doubt that this black squirrel is the same species, being much larger than the rock squirrel, and is said never to be seen in the same places with it, frequenting the higher mountains. Mr. Blyth says it resembles in size and colour the large

¹ Ann. Nat. Hist., 1867, xx. 278. Vide list at end of this chap.

common black squirrel, *S. bicolor*, of Eastern Bengal, but yet entitled to rank as a different species.¹

A remarkable ground squirrel, *Macroxus sublineatus*, similar to that of the Nilgherries, *S. sublineatus*, is found about Newera Ellia, and the higher mountains. The fur is dark olive, sprinkled with black, and has three narrow white streaks along the back, black tail, reddish grey chest and under parts. This squirrel is much subject to variations in colour, six or seven varieties having been observed.

Layard's mountain squirrel is a pretty little almost black species, with three orange or yellow streaks on the back. A specimen will be found in the British Museum. Among the new species added to the fauna of the island by Dr. Gray is the Raffles Java squirrel, *M. vittatus*, although it has been doubted if it be a native of the island.² It is found in Malabar, Malay, and Cochin China. The fur is olive with yellow streaks on the side, and a rufous chest.

Flying Squirrels.—Two species of these remarkable animals have been found in the island, but they are rare, chiefly frequenting the hills about Rambodde. The largest variety, *Pteromys petaurista*, with brown fur, is common to India and other places. The Sinhalese call them "egala-dandoleyna."

A membrane, connected with the skin of the flanks, extends along each side, joining the fore and hind legs, reaching down to the feet. They are enabled by the assistance of this singular contrivance, which spreads out when in the air, to make prodigious leaps among trees, usually leaping from the top to the ground. When walking or running, the membrane is folded up along their sides.

The other species is a sub-family, distinguished by the addition of flat tails, "*Sciuropterus*" of Cuvier, several varieties of which have been lately discovered in India, and one in Ceylon supposed to be peculiar to it, *S. Layardii*, allied to *S. caniceps* of the Himalaya. The fur is a rufous brown on the back, and white underneath, with a white face and long black whiskers; the tail is broad and flat and one foot long, the body being the

¹ J. A. S. Beng., 1851, 1847, xvi. 869, 1849, 602.

² Blanford, F.Z.S., Ann. Nat. Hist., 1868, p. 152; Gray, *idem*, 1867.

same length.¹ Flying squirrels are said to be nocturnal in their habits in India.²

Rats.—These uninteresting animals are very numerous. One species has developed its powers of mischief to an alarming extent since the extension of coffee-planting, proving a scourge to the planters; and two have been introduced by ships. One, the black rat (*Mus rattus*, Linn.), called “kalu-meeyo” by the natives, was formerly very numerous in England, but now nearly extirpated by the common brown rat, (*Mus decumanus*), brought from Norway, which seems to have the power of naturalizing itself everywhere, is found in Ceylon as well as the black rat in large numbers, and will probably end in expelling all the others, as the fecundity of the Norway rat is extraordinary, having nine young three times a year. It is said to be of Asiatic origin.

Waterton, the naturalist, is quite pathetic when he describes meeting with “a poor exiled British rat abroad, worried out of its native country by its prolific rival to find a home in other climes.”

Mus bandicota is the most remarkable of the indigenous species, called by the Europeans the pig-rat or bandicoot, a corruption of the Tamil “pandi-koku,” “oora meeyo” of the Sinhalese; they are a great size, weighing from two to three pounds, and of an ashy brown colour, with hind legs rather longer than the fore, a long head and pointed nose. They burrow in the earth, and feed on vegetables, rice, and other grains. The Malabars who eat them say their flesh resembles pork. They are found all over the island, being of a large size at Newera-Ellia.

The coffee-rat is similar to Elliot's *M. hirsutus* of Southern India, “watte meeyo” of the Sinhalese, a small species about four inches long with reddish-brown thick stiff hair, pointed nose, and very sharp teeth, who make their nests under roots of trees. They made their first appearance on the coffee estates in the Kandyan provinces, climbing up the trees and branches, and eating the buds and blossoms.

They migrate in vast swarms from one place to another,

¹ Layard, Ann. Nat. Hist., 1852, p. 337.

² MacMaster's Notes.

living principally on the nillo seeds, and when they are exhausted, transfer their attentions to the coffee plantations, much to the annoyance of the planters and delight of the Malabar coolies employed on the estates, who eat them fried in oil. A thousand have been killed on one estate in a single day: and so destructive are they, that some plantations ran a risk of being destroyed: the planters offer rewards for their capture. Great swarms of rats migrate in the Dekkan, destroying the crops,¹ likewise in Burmah.

Rats are also eaten by the Veddahs, who cut them open, and then smoke and dry them, like red herrings over a fire, on a wooden frame.

There are two species of tree rats, *M. rufescens*—"gas-meeyo" of the Sinhalese, and *M. nemoralis*. The first is white-bellied, with reddish-brown fur on the back, and the other darker: they are rarely found in low places, frequenting tops of trees, and roofs of houses. (*Vide* ch. xxvi.)

Burrowing, or field-rats, genus *Nesokia*, distinguished by short tails and long cutting teeth, present two varieties, found also in South India and Nepal.

The cinnamon garden-rat, *M. Ceylonicus*, the Newera-Ellia rat, a tawny-coloured burrowing species living in pairs, and a red-bellied mouse, *M. fulvidiventris*, are peculiar to Ceylon. The Indian Jerboa, (*Jerbillus Indicus*), a jumping or kangaroo-rat, is found all over the island, and is very numerous in the cinnamon gardens. They are about fifteen inches long, of a light brown colour, and make deep holes in the ground, eating grains, grass, and roots, and are also carnivorous.

There is a long description of Ceylon and Indian rats by Blyth in the J. A. S. Bengal, 1863, where he corrects some mistakes of Dr. Kelaart.

Hares.—The black-necked hare, "hava" of the natives, *L. nigricollis*, is common in most parts of the isle, and is found in South India, Java, and Mauritius, but not in Bengal.

The Porcupine (*Hystrix leucurus*) is another of the rodentia, very hostile to planters, destroying young cocoa-nut trees; and, being very crafty, are not easily caught; but the natives smoke

¹ Col. Sykes, J. A. S. Bengal, 1832, p. 165.

them out of their holes, and sometimes trap them in a narrow trench, the bottom of which slants downwards, the bait being placed at the lower end. When the porcupine reaches this point, the trench is too narrow for him to turn, and the quills prevent his backing out of it. They are great robbers of grain, which they store up in holes. In India the natives search for these places, and use the grain they find in them. The old story mentioned by Pliny (viii. 53), of the porcupine darting out its spines at assailants, is not correct; but they shake them with a loud noise when alarmed.

Mr. Blyth considers it doubtful whether the Ceylon porcupine is not a distinct species. Specimens have been sent to him from the island differing from the Indian; or there may be two species in it. A small variety is said to be found in the north about Chilaw and Jaffna.¹ There are no moles, or hedgehogs in the island; although both are found in the Nilgherries.

Horses are only used for pleasure, and are all imported, chiefly from the Persian Gulf, some from the Archipelago, and a few from Australia, which are considered the best. The majority of those brought from the Gulf are a miserable, weedy and vicious kind of pony, having but one good quality—that of endurance. The Pegu pony—as they are called in the island—from Achin, are a much better class of animal, being hardy, sure-footed, and docile, usually piebald, with deep necks and strong fore-quarters. Their manes are cut short.

Baldæus mentions that when the Dutch arrived in Ceylon, they found some wild horses in the Ile de Vacas, near Jaffna, descended from those let loose there by the Portuguese. Schreuder, one of the Dutch governors, succeeded in breeding some horses; and a miserable kind of pony was, some years since, reared at Jaffna, a mixture between the Arab and Carnatic. Entire horses are found to stand the climate best: any others are rare. They are all exceedingly vicious; and unpleasant scenes frequently occur when persons riding them get too near.

The importation of horses is as old as the time of Cosmas.

¹ J. A. S. Beng., xviii.

It is thought these animals do not thrive in Ceylon. After a time they become dull and feeble. The same remark applies to them in Southern India, where the ill success in breeding horses was formerly exaggerated into an impossibility, and extended to all India. A Persian historian, speaking of an elephant that was born in a stable in Persia, says : " Never till then had a she elephant borne young in Iran, any more than a lion in Rum, a tabby cat in China, or a mare in India."

In Ceylon they are fed on grain, a kind of pea (*Cicer arctenum*), and rice soaked in cold water, with grass. They do not give them the strange food we are told they get in Southern India to keep up their system,—such as milk, ghee, sugar, and occasionally, a boiled sheep's head ! This is mentioned by Marco Polo, who also comments on the impossibility of breeding horses there, " the best blood producing nothing but a wretched, wry-legged weed not fit to ride."

Wassaf says : " they bind them in a stable for forty days with ropes and pegs, in order that they may get fat, when the Indian soldiers ride them like demons ; so that in a short time the most swift and active horses become weak and stupid and good for nothing : hence there is a constant necessity of getting new horses. They give them roasted barley and grain dressed in butter, with boiled cow's milk." In the time of Marco Polo the same author says the merchants from the isle of Kais, in the Persian Gulf, and other places, exported annually 10,000 horses to Maabar and other ports in the vicinity, at the price of 220 dinars of red gold for each horse, equal to 100 marks of silver.

" The sheep's head is said to be peculiar to the Deccan ; but ghee is given by natives to their horses all over India."¹ The Arabs are also said to occasionally feed their mares with flesh.

Edentata.—The scaly ant-eater, (*Manis pentadactyla*), called " caballaya " by the Sinhalese, and also known by the Malay name of pengolin, is a very harmless and useful animal, living on white ants. They are nocturnal in their habits, sleeping all day rolled up like a ball, with the head between their fore legs and the long tail folded over all ; this is also an attitude they

¹ Col. Yule's Polo, ii. 388 ; Elliot, i. 69, iii. 34.

assume in self-defence when attacked by dogs, who can make nothing of them. Their frames are exceedingly powerful, and when rolled up in this way, it requires a considerable degree of force to uncoil them, which they resent by hissing.

They have one or two young, and live in pairs in the earth, into which they can burrow with great rapidity, digging out the soil with their powerful fore claws, which are always doubled under the feet when moving about, so that they appear to walk on their knuckles; several observers of their habits say they cannot climb trees, which has been stated by others.¹ They are covered on the back with pale brown triangular horny scales, and are about two feet long; they have no teeth, and lap water like a dog. There is a very good account of them in the J. A. S. Beng., 1842, p. 221.

PACHYDERMATA.—*Wild boars*.—It has been doubted if the animal found in Ceylon, “waloora” of the natives, is identical with that of India (*Sus Indicus*). A skull sent to Mr. Blyth presented some peculiarities differing from the Indian species, being distinguished by a straighter profile and greater length of head, resembling the Borneo *S. barbatus* of Müller and Temminck, and if all their skulls were the same, would entitle it to rank as a distinct species; or it may be the same as that found in the Nilgris (*S. affinis*²).

Wild pigs abound in the dense jungles of many parts of the island, and were very numerous about Newera-Ellia. It is very difficult to get near or catch them, though they are sometimes taken in pitfalls by the natives, and hunted by the Europeans with dogs; many of these animals are gored in encounters with them, the Ceylon wild boar being a very large, fierce and dangerous brute when brought to bay, always choosing a dense underwood to make a stand in. One killed by Sir S. Baker weighed four hundredweight. Their hair is a tawny brown colour, and they are subject to murrain; great numbers of them died in 1863 from this cause.³

¹ Col. Sykes, J. A. S. Beng., 1832, Tennent.

² Blyth in Kelaart, J. A. S. Beng. 1860, p. 105.

³ Blue Books, 1864, v., xi.

Elephants.—Asiatics say the last word never can be said about an elephant, which is some encouragement to a person writing on so exhausted a subject.

When the British obtained possession of Ceylon, the number of these animals in the jungles was extraordinary, 150 could be easily captured in a single kraal, and the rice crops in many parts of the island were so damaged by them that the Government paid a reward to the natives for every one they killed.¹ This stimulus to destruction, together with the wholesale and wanton slaughter by sportsmen, has reduced their numbers to such an extent that there is now said to be a difficulty in obtaining sufficient for the public works, and an order has been recently issued by the Governor prohibiting the granting of licences to shoot or capture them. Many other wild animals and birds are becoming scarce from the same cause.

Beyond those employed by the Government on public works no use is made of them in the island, but numbers are exported to India, where they are used in carrying stores and baggage for troops and other purposes; the trade is in the hands of the Moors, who catch and convey them to the Peninsula, where they are sold to other dealers. The price varies considerably, being more in demand in time of war, when they are worth from £20 to £36. In 1862² the average value was from £9 13s. to £16 18s. 8d., and the number exported, 326, valued at £3150. During the Indian mutiny Ceylon was unable to meet the demand for them, 1,034 being imported to the Peninsula from Rangoon and Moulmein from 1858 to 1859. Le Brun says during the Dutch occupation they were worth 2,000 rix dollars (£150).

Formerly when elephants were employed in war those of Ceylon were highly esteemed for this purpose, being considered from their size, sagacity, and courage superior to those of India, and commanded a very high price, considering the relative value of money, being worth, we are told by Cosmas, from 50 to 100 pieces of gold according to their height, or

¹ The reward was claimed for 3500 killed in the North in 1846-47-48, and for 2000 killed in the South from 1851 to 1856.—Tennent.

² Reports, 1864, xxxvii.; Blyth, J. A. S. Beng., 1862, p. 171.

about from £25 to £50. Megasthenes, in the earliest notice we have of the island, mentions their superiority, which is repeated by all ancient writers, and it came to be considered the "mother of elephants," and unrivalled for these animals.

The quantity of ivory obtained in the island is small. Very few Ceylon elephants have tusks, some say only one in a hundred have them, others one in three hundred, and then only the males; but most of them have short substitutes, called "tushes" by the Sinhalese, which are of no value. The proportion of tuskers in a herd is less than formerly, from their being selected for destruction on account of their ivory. Ceylon tusks seldom weigh more than 50 or 60 lbs., and are curved. Those from Africa are straighter and much larger, commonly weighing 150 lbs., and some are said to have weighed 300 lbs.,¹ which seems doubtful. A pair of tusks from Travancore were exhibited at the Madras exhibition, weighing 170 lbs., which was considered an unusual size for Indian tusks. 180 tons of ivory are said to be annually used in Sheffield for cutlery, which would require the slaughter of 3,600 tuskers. At this rate it is a wonder they have not been exterminated long since. Livingstone estimated that 30,000 elephants were killed annually in Africa, the greater part of their tusks being exported from the eastern coast along with those of the hippopotamus. Great numbers of fossil tusks are dug up in Siberia. Tusks of elephants in India are stated to be often eaten away at the roots by parasitic insects.²

Ceylon elephants are smaller than the African, their height ranging from seven to nine feet over the shoulder, but occasionally one taller is found. The Sinhalese say they can tell the height of an elephant from its foot-print, being, according to their calculation, six times the diameter, which for an elephant nine feet high would be 18 inches. Albinos are rare among these animals, and consequently highly prized by Asiatics. Some of their rulers are fond of calling themselves "Lord of the white elephant," to enhance their importance. Elephants with pale, flesh-coloured blotches about the head

¹ Tennent.

² J. Ento. Soc., 1871.

are not uncommon. Horace mentions that a white elephant was exhibited at Rome in his time,¹ and the Mahawanso speaks of one at Anuradhapura in the fifth century B.C. Mr. Boyd states that there were two at Kandy in 1782. Cæsar Frederick, in 1563, says "the King of Pegu had four, the rarest thing in the world," and Nicolo di Conti, a century previous, speaks of one belonging to the King of Birmah, round whose neck was a gold chain that reached the ground.

Elephants live to a great age, but the exact period does not appear to have been ascertained. Seventy years is stated to be the probable duration of their lives. Strabo quotes Megasthenes, as saying they lived three hundred years, and "the Sinhalese say the same, and that a dead elephant is never seen, as they retire to hidden places to die somewhere about Adam's Peak,"² which appears to be an Eastern legend, as it is found in Kazwini, from which Sinbad's account of "the burial place of the elephants" is taken, described by this romancer as an out-of-the-way place in Serendib, where the ground was covered with their bones and tusks.³ It has been ascertained at the birth of a young Indian elephant in the Zoological Gardens, London, that the period of gestation for this species is 593 days, or nearly one year and three quarters.⁴

It is strange that the derivation of the name of this animal in most European languages has not been satisfactorily explained. It has no resemblance to the Sanskrit *hasti*, or any other Indian name, unless it be a corruption of the Malayan and Telengu *Ani*, which is also the modern Tamil name. "The Sinhalese *alia*, or *alliah*, meaning huge or great, is said to be from a more ancient dialect than either Sanskrit or Pali."⁵

According to D'Alwis, the natives say elephants exude an odour of honey from an orifice in their temples, not larger than a pin-hole, which accounts for bees hovering about their heads.⁶ Curiously enough the same statement appears in Strabo (xv. 705), who speaks of an oily secretion exuding from it, which seems to be only a fancy as no European has

¹ Horace, Epist. i. 196, lib. ii. ² Tennent. ³ Lane's "Sinbad," iii. 74, 77, 81.

⁴ Owen, "Anatomy," iii. 42.

⁵ Tennent, Nat. Hist. Cey., p. 77.

⁶ "Sidath, Sangara," ccxiv.

ever detected this orifice, nor do bees appear to follow them more than flies, a great torment to elephants, who are constantly employed, both when wild and in captivity, keeping them off with a leafy branch held in their trunk.

Elephants are very fond of cool and shady jungles, especially during the heat of the day, and are only found in open places in the morning, which is a habit of most wild animals in tropical climates. From the number of elephants formerly found about Newera Ellia, which appears to have been their principal resort, it is evident they are not so fond of heat as people would imagine from their being natives of tropical climates. Dr. Davy, who passed through Newera Ellia in 1819, found it full of them, and observes that geologists should not attach too much importance to the fact of elephants' bones being found in cold parts of the world (p. 459).

That so heavy and apparently awkward an animal should be able to ascend the steep mountains about Newera Ellia, where the path is difficult of ascent to a pedestrian, may surprise many persons who are unacquainted with their habits, but this facility in ascending, and more particularly in descending activities, can be accounted for in the peculiar formation of their hind legs, the joints bending inwards instead of outwards as in other quadrupeds, which enables them to kneel on them, and thus slide down, the fore legs being kept straight out. A drawing of an elephant in this position, with its anatomy delineated, is given in the "J. A. S. Bengal" for 1844, p. 918. Sir Thomas Roe, who was sent by James I. as Ambassador to India, relates seeing there an elephant "that could climb up rocks, and pass such straits that no horse or other beast could follow him."¹

Elephants in their normal condition are gregarious, forming herds of various numbers up to a hundred or more, migrating from one place to another at particular seasons, and in this state are singularly unobtrusive and retiring in their natures; a person may live for a year in the vicinity of a jungle frequented by them in numbers, and constantly wander through

¹ Churchill, Coll. Voy., ii. 790.

it in search of small game without ever seeing or even hearing one, although he may be sure from their foot-prints, broken branches of trees, crushed underwood, and other signs frequently met with, that they are not very far off. Their disposition generally is to escape from observation as noiselessly as possible, and retire—at the appearance of a white man especially—into the deepest parts of the forests. . Their sight is defective, but they are endowed with a remarkable power of smell, which enables them to detect the approach of a person long before he can be heard; they are not easily surprised, and they rush off with the timidity of a hare, crashing through the underwood with great noise and force until they are out of sight. If danger is detected at a distance, they stand with ears thrown forward, and elevated trunk pointed in the direction it is perceived, snuffing the air until its nature is ascertained.

Rogue Elephants.—This name, applied by the Europeans to a certain class of elephants, is a literal translation of the Sinhalese “Hora-alliah,” or thieving elephant, so named from their mischievous propensities. . From some cause that has not yet been satisfactorily explained even to the natives, several of the males in a herd separate themselves from it, and become outcasts, wandering about singly, not even associating with other rogues, changing their otherwise naturally harmless character into one of extreme viciousness, seemingly bent on doing all the mischief in their power, and having overcome their fear of man by the first homicide, it becomes a favourite amusement with them, spending their whole time cunningly waylaying people and killing them. With this design, they hide themselves close to roads and foot-paths through jungles, pouncing on some unlucky passer-by, and occasionally interrupt the communication. On one occasion the “Post” from Colombo to Newera Ellia, and a convoy of bullock carts with commissariat stores, was delayed at Rambodde for more than a week by one, the natives being afraid to pass while he was in the neighbourhood. Few years passed without four or five persons being killed by rogues (*vide* ch. xxvi. p. 190), and nearly all the damage to crops is committed by them; it being a very remarkable fact that a very slight fence will keep

out other elephants, who usually display unwillingness to break through any artificial obstruction placed in their way.

Elephant shooting.—Some years since this was an exciting, dangerous, and useful sport when a rogue elephant was to be encountered, and required a considerable amount of cool courage, but the wholesale slaughter of herds of harmless animals is at all times an ignoble business, no use can be made of them, and their unburied carcasses defile the air. The small-bore rifles then used by sportsmen at times failed to penetrate the animal's skull, which placed the shooter's life in jeopardy; but now they use four-ounce balls, and large charges of powerful powder sufficient to crush the head of a mammoth, and the danger of encountering them is almost *nil*. Sportsmen are usually accompanied by several natives carrying loaded guns to hand to them in the event of the first shots failing, and it is usual to wait until the animals are quite close before firing. Most parts of an elephant's skull are formed of light honey-comb bone, easily penetrated, but some spots are weaker than others, immediately above the trunk and behind the ear are considered the most fatal places.

When a herd is surrounded and brought to bay by native beaters employed in these excursions, they never rush forward in a body as buffaloes do, but one or two more bold than the others charge their pursuers and are shot, then others do the same; in this way numbers of a herd can be killed in detail, before they break through the cordon surrounding them. As a general rule they are excessively timid, it is only when wounded that they become infuriated and savage in their assaults, having great power of enduring pain; however, an agile sportsman can generally manage to escape unhurt behind trees in a dense jungle, but in open rough ground a man has not much chance of escape if his shots fail, as an elephant can run much faster. When they do get enemies in their power they trample them under their feet, crush them by kneeling on them, or knock them about with their trunks, sometimes throwing them up in the air; but they do not use their tusks as a weapon of offence as often supposed, in fact the tusks, to the few who have them, appear to be of little use.

That elephant shooting is not a very dangerous sport is proved by the fact of one officer having killed, it is said, 1200, and some others nearly as many, with a loss of only three sportsmen killed and two injured, the three killed being by rogues. Sir S. Baker says, "no animals are more misunderstood, being savage, wary, revengeful, and courageous." This remark may apply to a rogue, a wounded animal, or to the males during the fits of madness they are subject to in captivity, at particular seasons of the year, when it is dangerous for even their keepers to go near them; but it certainly does not apply to them generally speaking. Linschoten mentions an incident that occurred at Goa, which shows that even a mad elephant can display gratitude for kindness shown to it. "This animal had got loose in the market-place at Goa, where it was destroying all before it, but recognising among the terrified crowd the child of a woman who had been in the habit of feeding him when passing her shop, he took it up in his trunk and carried it home in safety" (p. 87).

Elephants as executioners.—These animals appear to have been long employed in this capacity both in Ceylon and India. Ibn Batuta mentions seeing them in the peninsula with sword blades, or some similar weapon, attached to their tusks for the execution of persons condemned to death; and Knox says they were employed by Singha II. The executioner of the last king of Kandy fell into the hands of the English along with other spoil, and was sent to Colombo, where he was employed in carrying and stacking timber at the government stores. It is said when victims were brought to the elephant, who was trained for the purpose, at the word of command from his kornac he seized them in his trunk, and placing them under his foot, held them down firmly while their limbs were torn off in succession by his trunk; another method was to crush them to death at once.

Elephant catching.—A large number of elephants are employed by the Government on public works, who are captured in periodical hunts, organised on a grand scale; a very interesting sight, attracting to the scene every European in the island who can manage to attend. A herd is surrounded by

large parties of natives and driven into a strongly fenced inclosure formed in the jungle among the trees, having a funnel-shaped opening which is closed when they are inside. The captured animals are then noosed by the legs with the assistance of female elephants, who are trained for the purpose. Some years since these kraals, as they are called, were of frequent occurrence, but latterly they are rare, if not altogether abandoned. There was one on the occasion of the visit of His Royal Highness the Duke of Edinburgh. Elephants do not live long in captivity, and are expensive to keep, costing in food from 3*s.* 6*d.* to 4*s.*¹ per diem, and as the establishment connected with them is rather costly, it is a doubtful matter if the money would not be better laid out on other animals. Elephants appear to be very unwilling to exert their full strength, in fact, they cannot be got to do so; when urged beyond their inclinations they become restive, roar out, and show very plainly they will not be driven. It is common to see two of them side by side in a four-wheeled waggon, with a load not greater than could be drawn by two powerful dray horses.

The Moors catch them in a different manner, and nothing shows more completely the power of man over the brute creation than the facility with which a party of these men, with only a few ropes made of deer or buffalo hide, having nooses at one end, manage it. Elephants having, as has been remarked, delicate organs of smell, it is necessary, in order to get near them, to work against the wind, the trappers therefore first find out which way it blows; this being ascertained, they stealthily follow up an elephant's track in the jungle, crawling through the underwood until one of the men gets an opportunity to slip a noose over one of the animal's hind legs, their habit of constantly swinging one leg backwards and forwards greatly assisting the operation; this being accomplished, another man makes the rope fast to a tree as the elephant is making off, while others face him and distract his attention until more nooses are fixed on his legs, and he is

¹ Tennent, Nat. Hist. In the P. Z. S., 1863, there is a strange account of a manner of capturing elephants in Gaboon, Africa, by stupefying them with drugs.

thoroughly secured, when he is left to exhaust himself with impotent rage, bellowing and straining every nerve to get free, until he is quiet enough to allow of his being removed, when he is partly driven and partly enticed along until the coast is reached at Manaar, where they are shipped for India. A little kind treatment in the way of food speedily reconciles him to his captors, there being no wild animal so easily tamed as an elephant. Considerable difficulty is often experienced in getting them on board the dhoneyys which convey them to India, but they stand the sea very well.

Elephants are supposed to be very cautious in ascertaining whether a place will bear their weight before they pass over—a male elephant ten feet high weighing about three tons; but this seems to be only an idea, judging from the number of wooden bridges broken down by them in the island, and the swampy places about tanks they frequent in search of water; besides they are said to have been formerly caught in a kind of pitfall, on the top of which a running noose was concealed, the other end being fastened to a tree, the animal's foot when sinking causing the noose to run up the leg.¹ They are also taken in common pit-falls in some parts of India,² and South Africa.

The stomach of an elephant is rather peculiar in its formation, being very long, with a number of folds at one end, and as they can draw water from their stomachs with their trunks, Sir E. Tennent has suggested that this peculiarity of formation is something similar to the water-sack of a camel, and expected Professor Owen's dissection of a young elephant which was sent from Ceylon would verify his supposition. But on referring to Professor Owen's "Anatomy of Vertebrates" (Ed. 1868), there does not appear to be any allusion to it, although he has described the "water-cells" of the camel and llama.

There is also an account by Dr. Crisp in the "Lancet," 1854, of the viscera of an elephant which died in England, and in the "P. Z. S.," 1859, of a female in the Zoological Gardens, which died, it is supposed, of fright from a thunder-

¹ Tennent, Nat. Hist.

² J. A. S. Beng. 1848.

storm. She weighed 5,225 lbs. Elephants have no gall bladder, the hepatic duct being wide and long, similar to some giraffes.

RUMINANTIA.—Deer.—Except the elk these are not often found in dense jungles, where there is little food for them, but frequent in large herds the open places on the eastern coasts. They are also very numerous about Hambantota, on the wide plains of white sand and low brush-wood of the south-east.

The musk-deer, “wal-mooha” of the natives (*Moschus moschiferus*), is a charming little creature about two feet long and ten inches high; it has the long tooth curving downwards outside the lip from the upper jaw like the musk-deer of Thibet, but has no musk-bag, and is much smaller. Their usual colour is a brown-grey, and albinos are not rare. Captain Percival mentions that five were found at Kandy in 1803.

The muntjac or barking deer (*Stylodactylus muntjak*) is a very common species, about two feet and a half high; “hoola-mooha” of the natives, also the spotted deer, “tee-mooka” (*Axis maculata*), very like the fallow deer of England in size and shape. Albinos are frequently found among them.

The paddy field deer, “weel-mooha” (*Axis Orizus*), allied to the porcine deer of India, is supposed to be a distinct species and peculiar to Ceylon. They are small and active, of a light fawn colour, with two parallel lines of white spots along the back. Some were sent to the Zoological Gardens, London.¹

The elk, “gona-russa” of the Sinhalese, is very abundant about Newera Ellia and other high mountains. A nocturnal animal, spending the day in deep forests, it begins to wander at sunset into open places; they are fond of ravines and mountain torrents, in which they take refuge when pursued by dogs, and do not afford much sport from their habit of getting into water as soon as they can. Their flesh is not much better than bad beef.

The elk is a large animal four feet high, of a dark muddy-brown colour, with a coarse mane six inches long, and large heavy antlers; the body is nearly five feet long. Dr. Gray² makes the *Russa* of Ceylon and India a distinct species from

¹ J. A. S. Beng., 1851, p. 217.

² Ann. Nat. Hist., 1852.

that of Java and Sumatra, and identical with the great *Axis* of Cuvier. According to some, the Ceylon elk is a variety of the Saumer of India.

Buffaloes, "mee-harak" of the natives, are heavy-looking animals found wild in large herds on open grass, swamps, and about tanks, chiefly in the north-eastern and hottest parts of the island. During the heat of the day they bury themselves in mud or pools of water, nothing but the head being visible. They are animals of immense bone, strength, and activity, usually of a muddy-brown colour, but occasionally an albino is seen with a pink iris. There is very little hair on their hides, which have a shining appearance, and not unlike India-rubber. They are high over the shoulders, and broad and flat on the haunches; the nose is fine and the head surmounted with long heavy corrugated horns bending backwards. They carry their heads in a peculiar manner, the upper part being thrown back, with the nose in a line with the shoulder.

When a herd is disturbed and they apprehend danger, they draw up in line with a few of the oldest in front, and after gazing silently at the enemy for some time, suddenly retire or advance at full speed, and are considered by sportsmen,¹ from their uncertain and furious temper when roused, as a very dangerous animal to encounter, particularly as they can receive several balls of ordinary size in the chest without flinching. Behind the shoulder is their most vital part. There are as many natives killed by buffaloes as by any other wild animal. Their flesh is very bad, but they give more milk than native cows. Numbers of tame ones are employed by the natives in agriculture—treading-out grain and ploughing paddy fields, for which purpose they are admirably suited, from the peculiar formation of the bones of their feet, which are large and spreading, enabling them to walk over the soft mud of paddy fields, when other animals of their size and weight would sink too far. The reindeer of the north of Europe has a similar forma-

¹ Baker, "Rifle and Hound." In a Burmese version of the "Niti-kyan," buffaloes are said to delight in mud; the henza (goose) in beautiful lakes; women in the society of men; and priests in the words of truth.—J. R. A. S., vol. xvii. p. 254.

tion of foot, which enables them to move over deep snow.¹ Buffaloes are also trained for wild fowl shooting. (*Vide* ch. xxv.)

Oxen.—All the species in the island are of Indian origin. A variety of the Indian bullock (*Bos indicus*), called “harakah” by the Sinhalese, is the common beast of burden on the roads. These cattle, although unknown as an aboriginal species, are said to relapse into a wild state both in Ceylon and India.² They are very pretty, smooth-skinned little animals, with a hump on the shoulder, deep dew-lap, slender deer-like limbs, and not taller than a pony. They are of two colours—the deep red, which are the most numerous, and the black, a higher-bred animal. They generally draw two-wheeled carts in pairs, a cross-bar at the end of a pole resting on their necks in front of the hump which keeps it in its place; it is an unlucky bump for the poor animals, who are most barbarously overworked in consequence. A rope passing through holes in the bar goes under the bullock’s neck, and prevents it from rising up. The carts are generally covered with a thatch of cocoa-nut leaves.

These bullocks are very strong and energetic for their small size, and draw a load of from 12 to 15 cwt. twenty miles a day, according to the road. In parts of the island where there are only bridle-paths, they carry loads on their backs on pack saddles, and are principally used in this way by the Moors, who carry on an inland traffic with hamlets and villages, travelling in small parties called “talavans.” Bullocks are much afraid of panthers, whom they can perceive a long way off, when they become unmanageable and subject to panic. Murrain makes great havoc amongst them, in some years killing them wholesale. In 1800 half the animals in the island are reported to have died.³

Since the extension of coffee planting the ordinary bullocks have proved quite inadequate to convey the produce of the estates to the coast, which has led to the importation of larger animals from India who can draw from 20 to 35 cwt.⁴ Some years since the Government tried to introduce camels, but

¹ Owen, “On Limbs,” p. 34.

² J. A. S. Beng., 1860, p. 233.

³ Cordiner’s Ceylon.

⁴ Reports, 1863, xxxdii.

they all died from sore feet caused by flies. A few white Brahmin bulls and oxen are used singly between shafts in light two-wheeled covered carts (called hackeries) by richer natives for driving about, and are similar to the Indian conveyance.

The *Bos gaurus*, or gaur, so abundant in Southern India, is extinct in Ceylon. Kandyan tradition¹ says they formerly roamed through the forests of the districts named to the present day Goura-Ellia and Goura-Koodie. Knox describes one which was kept among the king's creatures at Kandy, and some old natives state another has been seen in the jungles during the present generation.

CETACEA.—The strange amphibious animal of the whale family called the dugong or mermaid (*Halicore dugong*), whose partial resemblance to the human form when swimming, caused by their habit of keeping their heads at times above water, has doubtless given rise to the ancient belief in mermaids, sea tritons, nereids, and sirens, who lured sailors to their destruction by their voices; in all probability first circulated by Greek and Arabian navigators in eastern seas. Cuvier remarks they have no real resemblance to human beings, which is evident. The female is said to carry her young with her in the sea, keeping its head above water. The Sinhalese call them "moodo-oorā," and the Malays duyong, changed into dugong by the naturalists. Mr. Holdsworth, P. Z. S., 1872, referring to the dugong, says "this creature as figured in Sir E. Tennent's Natural History, has never been observed by myself or anyone I have been able to meet with." The drawing is obviously incorrect.

The head and shoulders resemble those of a seal, and has two fore limbs or arms ending in fin-like paws, the rest of the body is like a whale, and about seven feet long. They are sometimes eaten, and said by Baldæus, who calls them sea-calves, to resemble veal; while Crawford states the Malay dugong is superior to green turtle; their oil has been recently highly recommended as a substitute for cod liver oil. They are very numerous on the north-western coasts about Aripo and Manaar, living on sea-weed and other marine produce. The

¹ Kelaart, p. 87.

existence of these creatures was not unknown to the most ancient writers on Ceylon—Megasthenes, Onesicrites, Strabo, and Ælian, who speak of sea animals half fish having heads like women and satyrs.

Sir E. Tennent produces a number of curious statements from authors showing the extent that imagination has run riot on this subject as late as the eighteenth century. Valentyn says a mermaid was taken in a storm on the coast of Holland in 1404 and conveyed to Haarlem, where she was taught to spin, and died a Christian! To these may be added the statement of Dalechamp in his notes to Pliny (ix.), who says a mermaid was captured in Poland, 1531, like a bishop!

Delphinus.—Three species of true dolphin which resemble small whales are occasionally caught off Colombo. They have long jaws with many teeth, and a blow-hole through which they make a plaintive noise when dying, and change when taken from the water to a fine gold and pink colour. Their flesh is said to be made into the dried fish called kummelmus in the Maldives, and are often confounded with the *Coryphæna hippurus*, named *hippurus* by Aristotle, on account of its mane-like dorsal fin.

Many fabulous statements have been made about the dolphin. Pliny represents it as "an animal friendly to man and fond of children and music." The same stories are found in Plutarch, Aristotle's "History of Animals," and Ælian. It is not quite clear whether the ancients in their descriptions were referring to the true dolphin or the *Coryphæna hippurus*, also called a dolphin. The latter term appears to be derived from doly or daphin, a name used by Barbot in the seventeenth century. The Portuguese had previously called them dorades, confounding them with the *Chrysophrys* or gilt-head.

Phocæna.—Porpoises are also occasionally caught by fishermen on the coast; great shoals of them are seen at sea leaping out and into the water as if running a hurdle race, which is considered a sign of bad weather by seamen.

Whales.—Sperm whales (*Physeter macrocephalus*) are not uncommon on the eastern side of the island, and other species are occasionally stranded on the southern and western coasts.

They appear to have been much more numerous in the Indian seas some centuries since.

E. W. Holdsworth, F.Z.S., describes a new Cetacean seen by him off the coast at Chilaw during a calm, being attracted to it by a blowing sound, as it partly rose above the water; it appeared to be about 25 feet long, having a round back and a remarkable dorsal fin 5 feet high shaped like a sword-blade. He was informed by the native fishermen that it had been seen before, and also off Cape Comorin, and was known as the Palmyra fish, and that they were very pugnacious—running at each other like sheep. It has some resemblance to the *Orca Eschnichtii* of the Faroe Islands, observed by Steenstrup (P.Z.S. 1872, 583).

LIST OF MAMMALIA.

* Peculiar to Ceylon.

† New Species.

QUADRUMANA.

Presbytes cephalopterus, Zim.

**ursinus*, Blyth.

Priamus, Elliot.

**Thersites*, Blyth.

Macacus pileatus, Shaw.

loris gracilis, Geoff., var.

Nycticebus Ceylonicus, Geoff.

Hipposideros armiger, Hodgs.

insigna, Waterhouse.

vulgaris, Horsf.

Kerivoula picta, Gray.

Taphozous longimanus, Harw.

Scotophilus Coromandelicus, Cuv., a var. *S. minuta*, Temminck, has been found in Africa, P. Z. S., 1867.

Vespertilio adversus, Horsf.

Nycticejus Temminckii, Horsf.

Tickelli, Blyth.

Heathii, Horsf., P. Z. S., 1831, p. 113.

CHEIROPTERA.

Pteropus Edwardsii, Geoff.

Leschenaultii, Dum.

Cynopterus marginatus, Cuv., margin and red-eared bat.

Megaderma spasma, Linn., large eared bat, has three nasal leaflets.

Ira, Geoff., J. A. S. Beng., xiii. 489.

Rhinolophus affinis, Horsf.

murinus, Elliot.

Hipposideros murinus, Elliot.

fulvus, Blyth.

speciosus, Elliot.

CARNIVORA.

Sorex coerulescens, Shaw.

indicus, Geoff., J. A. S. Beng., xvi.

serpentarius, Geoff., Kelaart's S.

Kandianus, J. A. S. Beng., xvii.,

also found in Birmanah, J. A.

S. B., 1855, p. 30.

**Montanus*, Kela. There is also a

- black shrew in Nepal. *Vide* Hodgson.
 ferrugineus, *Kela.*, a reddish shrew, doubtful if peculiar.
 *feroculus, *Kela.*, allied to *S. pygmaeus*, *Hodg.*, of Nepal, J. A. S. Beng., 1855.
Prochilus labiatus, *Blain.*
Lutra nair, *Cuv.* The Indian otter, *decy bella* of the Sinhalese.
Canis aureus, *Linn.*
Viverricula malaccensis, *Gray.*
Paradoxurus typus, *Cuv.*
 *Ceylonicus, *Pall.*, *F. aureus*, *Cuv.*
Herpestes griseus, *Desm.*
 vitticollis, *Benn.*, *Tæniogale vitticollis* of Gray, P. Z. S., 1864.
Onychogale Maccarthii, *Gray*, P. Z. S., 1851, 1864. *H. flavus*, *Kela.* of Tennent's list.
Calotes Smithii, *Gray*, *H. Smithii*, *Gray*, of Tennent's list, P. Z. S., 1851.
Felis pardus, *Linn.*
 viverrinus, *Benn.*
 affinis, *Gray*. *Chaux*, *Blyth*.
 rubiginosa, *Geoff.*
 var. similar to *F. Jerdonii*, *Bly.*
- RODENTIA.
- Macroxus macrurus*, *Gray*. *Sicurus macrurus*, *Forst.* of Tennent's list.
 †var. *S. macrurus*, *Blyth*, end of tail white, J. A. S. Beng., xviii. 600, *Gray*, Ann. N. H., 1867.
 var. *S. Tennentii*, *Kela.* *Gray*, Ann. N. H. 1867, J. A. S. Beng., 1851, p. 165.
 †*Macroxus vittatus*, *Raffles*, added by Dr. Gray, Ann. N. H. 1867, p. 278.
 †*palmarum*, *Gray*. *S. palmarum*, *Horsf.*, olive black, three pale streaks on the side, white below.
 †var. *S. Kelaartii* of Layard with uniform fur and shining stripe, under parts reddish. *Gray*, Ann. N. H., 1867.
- Macroxus penicillatus*, *Gray*. *S. trilineatus*, Kelaart's list. *S. Brodeii*, Layard Ann. N. H., 1852, ix.; dark olivo fur on back and sides, three pale streaks, middle of back black, head reddish, chin, chest, and underparts white.
 Layardii, *Gray*. *S. Layardii* of Kelaart and Blyth; tail black annulated with white, chin and underpart reddish.
 sublineatus, *Gray*. *S. sublineatus* of Waterhouse. There are six or seven var.
Sciuropterus Layardii, *Kela.*
Pteromys petaurista, *Pall.*
Mus bandicota, *Becht.*
 rattus, *Linn.*
 decumanus, *Pall.*
 manel, *Gray*. The Indian mouse, *cossetta meyo* of the Sinhalese.
 rufescens, *Gray*.
 nemoralis, *Blyth*. J. A. S. Beng. xx. 168.
 *Ceylonicus, *Kela.*
 *fulvidiventris, *Blyth*.
Nesokia Indica, *Geoff.*
 **Golunda Newera*, *Kela.*
 Elliotii, *Gray*. *Mus hirsutus*, *Elliot*. *M. coffeus*, *Kela.*
Gerbillus Indicus, *Hardw.*
Lepus nigricollis, *Cuv.* J. A. S. Beng., 1851.
Hystrix leucurus, *Sykes*. J. A. S. Beng., 1851, p. 153.
- EDENTATA.
- Manis pentadactyla*, *Linn.*
- PACHYDERMATA.
- Elephas Indicus*, *Linn.*
Sus Indicus, *Gray*.
- RUMINANTIA.
- Moschus meminna*, *Erzl.*

Styllocerus muntjac, *Horsf.*

Axis maculata, *Smith.*

**oryzus*, *Kela.*

Russa Aristotelis, *Cuv.*

Bubalus buffelus, *Gray.*

Bos Indicus, *Linn.* (var. of zebu).

CETACEA.

Halicore dugong, *Cuv.*

Delphinus velox, *Duss.*

Longirostris.

plumbeus.

Phocæna.

Vide Blyth on Ceylon, "Mammalia," J. A. S. Beng., 1851, 1852, and Cantor on that of Malav. 1846.

CHAPTER XXV.

BIRDS.

ABOUT 330 species have been identified, most of them by Mr. Blyth, from specimens sent to him from the island by Drs. Templeton and Kelaart, and Messrs. Brodie and E. L. Layard, C.C.S. ; "to the latter much praise is due for discovering so large a number of birds previously unknown to the fauna of the island, nearly all in his list having fallen by his own gun." Mr. Blyth's descriptions are given in different numbers of the J. A. S. of Bengal, from 1846 to 1857. The numbers for 1850 contain a general account of Indian and Ceylon ornithology, and those for 1851 a particular description of remarkable Ceylon birds. Mr. Layard's accounts will be found in the "Annals of Natural History," ending 1854.

Great as the above number may appear, they are only one-third of the birds of India, for although there are about 30 of the feathered tribe enumerated supposed to be peculiar to Ceylon, there is a much greater number of Indian birds unknown in the island. Among the Indian birds wanting in Ceylon are vultures, several species of eagles, buzzards, and other birds of prey, both diurnal and nocturnal falcons, owls, and caprimulgida, many warblers, fly-catchers, and smaller birds, *Tringlodytinæ*, *Calliope*, *Turdidæ*, *Luscinia*, and *Ruticilla*. On the other hand, most of the birds peculiar to Ceylon are represented in the Peninsula by very similar or allied species. Seven or eight of those entered in Sir E. Tennent's list as peculiar have been since found in Southern India and other places, and thirty-three new to the island have been discovered,

¹ Kelaart, Fau. Zey. p. 93 ; between 7000 and 8000 species of birds from all parts of the world have been described by naturalists.

which are included in the above number. About twenty are so seldom seen they can hardly be considered as belonging to the island, being occasional stragglers from India. Most of those peculiar to Ceylon are only found in the hills.

A valuable "Catalogue of Ceylon Birds" was published in the P.Z.S. for 1872, by E. W. Holdsworth, F.Z.S., who spent some years in the island, and made a collection, the majority of those discovered since Layard's list being added by him. He has altered the names of a good many of those previously known, having been, he says, wrongly identified, and makes the total number 325; among those he omits is the large horn-bill (*Buceros pica*), probably from some oversight, as they were numerous in the island.

The majority of the birds found in Ceylon belong to India, some to Birmah, the Archipelago, and China; a few of the forms are quite Malay, as the *Prionochilus* recently discovered, and have not been noticed in India.

There is quite an absence of works on the ornithology of Ceylon similar to those descriptive of Indian birds, by Latham, Sykes, Gould, Hodgson, Tickell, and Jerdon, who published in 1839 a description of 390 Indian birds, with a new edition in 1862-4, enumerating 1016 species. Besides these must be mentioned Horsfield's "Catalogue of the East India Museum." Mr. Blyth remarks that many Ceylon birds have a darker hue and brighter markings on their feathers than those of similar species in India, while some are paler. Temminck points out a similar distinction in the birds of Sumatra, which are brighter than those of other parts of the Archipelago.

Dr. Kelaart says Europeans arriving in the island for the first time are frequently disappointed in not finding as many birds with gorgeous plumage as they had been led to expect, but upon a more intimate acquaintance with the feathered tribe in Ceylon they will find that, although in general not so gaudy as those of South America and other places, there are many possessing more real beauty and harmony of colour, while in grace of form they are unrivalled." The song of several rivals that of European birds, but generally speaking

a cool climate is in some way necessary to produce song in the feathered tribe, the gaudy birds of tropical countries being usually quite deficient in this respect. Among the low-country songsters will be noticed the charming flute-like notes of the oriole, and the rich voice of the dayal-bird of the Europeans (*Copsychus saularis*), while in the mountains the long-tailed thrush, the Newera-Ellia robin, and black-bird, remind the invalid at this sanatorium of their European namesakes.

Generally speaking, it is only on emerging from the denser parts of the jungles, and approaching the margins of tanks, rivers, ravines, and open country that birds are very numerous; for they seem to rejoice in the light, and avoid the deep gloom of the interior of the forest, particularly in the morning, when the air in these localities resounds with the cries of a host of finches, fly-catchers, parroquets, and peacocks, who make up in noise for the want of harmony in their voices.

In the hotter parts of the isle, many birds retire during the great heat of mid-day into the deep shade, where they hide themselves. The same absence of birds has also been noticed in the denser jungles of India.

The chief feature in the ornithology of Ceylon is the vast number of parroquets and profusion of fly-catchers. Also water-fowl, which in endless variety frequent the lagoons and marshes, chiefly in the eastern province about Batticaloa and places more north, the trees on the sides of the lagoons where many of them make their nests are white from their droppings, and the young birds who fall into the water underneath become the prey of the crocodiles who infest it.

Many representatives of British birds are found in the island, wagtails, sparrows, king-fishers, crows, hawks, kites, herons, &c. Mr. Blyth remarks few persons have any idea of the extent to which British birds are found in Southern India.¹ Some are migratory, but their habits in this respect are uncertain, most of the wild ducks and other water fowl migrate, arriving with N.E. monsoon; among them is the Indian snipe (*Gallinago stenura*). The other migrates are the green wagtail, the Philippine weaver bird, and the bee-eater, the rose-coloured

¹ In Calcutta Jour., No. 55.

starling, several of the swallows, the finch lark, the hoopö, the yellow wagtail, *Phyllopneuste nitidus* and *Tephrodornis affinus*, which is said to be only found in Ceylon, its other habitat has not been defined. *Phyllopneuste montanus* and *Lanius erythronotus*, both Himalayan birds, are found at Point Pedro, and several other Indian mountain species frequent the sea coasts of the island.

Although there is no distinction of seasons as in Europe, most of the birds make their nests in the early months of the year, but it is not a general rule, as the eggs of some are found at all times.

ACCIPITRES.—*Eagles*.—With a few exceptions, eagles are neither large nor numerous in the island; the Genoese eagle (*Aquila bonelli*) is so seldom seen, little is known of its habits; it probably migrates from India, where it is considered a fine bird, loving high mountains, wild places, and lofty trees, soaring at a great height in the air.

The pennated eagle (*Aquila pennata*), and the crested Nepal eagle (*Limnaetus Nipalensis*) are also rare; the latter, a noble bird, has been found in the mountains, where the Malay eagle (*Neopus Malayensis*) is more often seen.* The crested Java eagle (*Spizaetus limnaetus*), a bold and daring bird, is found in all parts of the island, haunting the hamlets of the natives, and carrying off their poultry from before their doors. The pennated eagle is much dreaded in India from the same habit.

The crested serpent eagle (*Spilornis bacha*) is abundantly and widely distributed throughout the island. This fierce and gloomy tyrant of the jungles lies in wait for its prey near tanks and marshes, concealed in the overhanging trees, from which it pounces on the fresh-water snakes, frogs, and other reptiles found in these localities. "When a frog perceives its shadow over him he crouches and changes his colour, so as to be hardly distinguished by the human eye, but to no purpose, for the next instant he is in the eagle's claws."¹ This eagle builds its nest in trees, and its doleful cry is as much dreaded by the superstitious Sinhalese as the "oolanna." Holdsworth says it is not the true Cheela of India.

¹ Layard.

The white-bellied sea eagle (*Pontoaëtus leucogaster*) is a formidable looking bird, and the largest bird of prey in the island, chiefly frequenting the northern shores and salt marshes, and the sandy mud banks of Adam's Bridge, rising heavily in the air, but when well on the wing "has a noble and imposing flight as it hovers over the sands and swoops down on fish caught in shallow waters, crabs, or sea snakes, and with an exulting cry soars aloft with a victim in its claws."¹ The fishing eagle (*Pontoaëtus ichthyaëtus*) is found chiefly near tanks and marshes in the Wanney, preying on fish, frogs, and snakes. The Ceylon eagle (*H. spilogaster*), as it is called in Layard's and Tennent's list, is now said to be only a young Bacha (Holdsworth, P.Z.S. 1872); Jerdon had previously suggested that it probably came from Southern India (i. 79).

Kites.—Two or three species frequent the sea shores and shallow waters, preying on small waders, fish, or any garbage. The most common is the Govinda, or black kite of the Europeans and Pariah kite of the natives (*Milvus govinda*), their great resort being the northern and western shores, haunting the streets of native fishing hamlets and villages, fighting with the pariah dogs over the garbage from the canoes. Jerdon says people have no idea of the vast number of these birds in India, frequenting the streets of Calcutta and other towns picking up garbage; they also follow every camp in the Peninsula, being fearless and useful scavengers, contending with crows and dogs for any refuse to be found. They are said when gorged with food to bask in the sun with outstretched wings on entablatures of buildings in the attitude of the hawk depicted on Egyptian monuments.² Sevas kite (*Haliastur Indus*) is common along the whole sea board, particularly near mouths of rivers, preying on carrion. They build their nests of sticks in trees near water, and feed their young on soft reptiles. They have been dedicated by the Hindus to Seva, who, along with the Mahometans, regard them with superstition; they say when two armies are about to engage in conflict their appearance over either party prognosticates victory to that side.³

¹ Layard.

² Buchanan, quoted in Horsfield's Catalogue.

³ J. A. S. Beng., x. 629, 1849.

Hawks.—The kestrel falcon (*Tinnunculus alaudarius*), a bold little bird, is common on open plains, hunting in couples, skimming close to the ground, darting on small birds. Two species of harriers (*Circus Swainsonii* and *C. cinerascens*) are found in similar localities; also in paddy fields, cultivated grounds and swamps, preying on birds and reptiles, seizing water snakes with a swoop as they skim over the surface.

The three-streaked kestrel (*Astur trivirgatus*) is a bold and daring bird, found chiefly in the mountains, breeding in steep rocky places, where it is common, robbing the chickens and young poultry of the natives. Swift and wary, it usually escapes all attempts to shoot or capture it. They are trained by the Sinhalese as hunting falcons, their eyes being darkened by a silken thread passed through holes in the eye lids, which are thus drawn together at pleasure.¹ The sparrow hawk of Europe (*Accipiter badius*) is common, but the rest of the falcons in the list are rare, the peregrine falcon being only found about Jaffna. In India, it is called the Sultan falcon, and much used for hawking.

Mr. Holdsworth says a species of buzzard (*Buteo desertorum*) in Lord Walden's collection was obtained in Ceylon; it was probably a straggler from India. The existence of buzzards as natives of the island is very doubtful.

- *Owls*.—The large *Bubo orientalis* of India has not been noticed in the island. Most of the Ceylon species feed on insects or fish; they are rarely seen hunting after mice as in England.² The largest is the *Ketupa Ceylonensis*, or brown fish owl, a strong bird with bare legs and feet. The "bak-kamuna" of the natives, common in all parts of the island, building in gloomy, rocky places, among thick jungles, emerging with the twilight from concealment, uttering a loud unpleasant cry. They prey much on small fish, which they catch in shallow water during moonlight nights, and are fond of perching on trees overhanging tanks. A small-tufted owl (*Ephialtes lempijii*) is equally common with the preceding during moonlight nights, hunting among trees for beetles, with a melancholy kind of barking cry. It is also found in Nepal and

¹ Layard, Ann. Nat. Hist., 1853, p. 104.

² Kelaart, Fau. Zey.

Malabar. Holdsworth, in his list, has restored the old name of "bakkamuna," given by Forster in 1781, who erroneously applied to it the native name of the larger species. He "doubts if Dr. Kelaart's description of tufted owls in Ceylon is correct. A good deal of confusion has existed among these species in India, and have been variously named by naturalists." Eared owls are distinguished by two tufts of feathers, which rise on each side of the head like ears, giving them a cat-like look.

- A little owl, of a deep chesnut colour, faintly banded with red, called "punchy bassa"¹ by the Sinhalese (*Athene castanotus*), principally found in the mountains, and occasionally about Colombo and Ratnapura, first noticed by Dr. Templeton, is said to be peculiar to Ceylon. Mr. Blyth considered it close allied to the Java species (*A. castanopterus*), and three of the smaller owls of India.² The wing is only five inches long. They are usually seen in the mornings and evenings, and during moonlight nights, preying on geckoes and insects creeping up trees.

Jerdon says "the *Athene brama*, a littled spotted jungle owlet, is found all over India, Ceylon, and Burmah."³ If so, it is new to the ornithology of the island, not having been noticed by any other observer in it. The back is grey brown, each feather having two white spots, beneath is white barred with brown. Holdsworth introduces a new species of horned owl (*Huhua pectoralis*), not uncommon in the lower mountains. It closely resembles *H. Nipalensis*, only smaller, and might also be mistaken for a *H. lempigii* (P.Z.S. 1872).

Strix Javanica is only found about the fort of Jaffna, and at Aripo, hiding in holes in the ramparts, and feeds much on fish caught in shallow water. It is closely allied to the barn owl (*Strix flammea*) of England.⁴

Syrnium indranee, a brown wood owl, found in lonely jungles, is supposed by some to be the "oolanna," or devil bird of the

¹ "Punchy bassa" means little owl. "Passa" is a general name for owl among the Sinhalese.

² Vide Horsfield's Catalog., ; Blyth, J. A. S. Beng., xv. 280.

³ i. 142, ed. 1862.

⁴ Kelaart.

Sinhalese, whose horrid shriek at night terrifies the natives out of their senses, being considered a sure forerunner of some misfortune when it is heard in the vicinity of their huts.

There is really something very mysterious attached to this cry, for, although nearly every person in Ceylon who lives in the jungle has heard it at night, yet nobody seems to have ever seen the bird or shot one in the act of shrieking, or can give any positive idea of what it really is,—“some think it is not an owl, but a black night-raven;”¹ others doubt about its being the *S. indranee*, as in India, where the natives are equally afraid of this shriek, and women wrap their clothing round their ears when they hear it. The *S. indranee* is said never to approach houses. Horsfield says, “the *Athene scutellata* is the devil-bird of the Hindus.” Holdsworth thinks the devil-bird must be the *S. indranee*: he mentions hearing these cries at Aripo,—“piercing and convulsive screams so horribly agonizing it was difficult to believe murder was not being committed; so, rifle in hand, he ran cautiously to the jungle, followed by his servant, but before he reached the place the cries had ceased.” Knox says, “I have often heard it myself, and it frightens the dogs;” but he did not appear to know what species of bird it was.

Pigafetta mentions that, in the Philippines, every night a black bird, the size of a crow, came at night, and by its screams frightened the dogs.

The superstitions connected with the screech-owl, or night raven, is mentioned by Shakespear, who writes:—

“It was the owl that shrieked, the fatal bellman,
Which gives the sternest good night;”

and was known to the Romans, who also appear to have been in doubt as to the kind of bird that produced these sounds, some of their descriptions being quite fabulous.²

“Nocturnæque gemunt striges, et feralia bubo
Danua canens.”—Statius, Theb. iii. 511.

¹ Tennent, vol. i. Horsf. Cata., p. 69; J. A. S. Beng., xvi. 464, xiv. 184.

² Ovid. Fasti, vi. 139; Plin., x. 17. Tibullus, Eleg. l. i. v. 52. From the earliest times the owl has been generally regarded as a bird of evil omen; by the Greeks it was considered as an emblem of wisdom and dedicated to Minerva.

Caprimulgidæ, or *Goat-suckers*.—Formerly deemed of evil omen, derived their name from having been supposed to enter at night into the folds of shepherds to suck the udders of goats, which caused them to shrivel up from the injury (Plin. x., 56); they are also known as night-jars and night-hawks, generally appearing during twilight and moonlight, but never when quite dark, and live on insects.

Layard's *Batrachostomus moniliger*, which is not a true *Caprimulgidæ*, found among steep rocks in the mountains, is a rare and singular bird, remarkable for the brilliancy of its eyes at night; the plumage is a reddish brown mixed with black and white. It was supposed to be peculiar to Ceylon, but has been found in Malabar, and known as the Wynand frog-mouth (*Podargus Javanica*);¹ the order to which it belongs are named from their wide mouths resembling those of frogs.

A goat-sucker, named "Sa bassa" by the Sinhalese, *C. atripennis*, is common about Colombo and the south, hiding in the day among trees; during rainy evenings, when white ants are swarming, they are actively engaged along with crows and bats in exterminating them. Holdsworth says, "this bird was mistaken by Layard for Sykes' Maharatta goat-sucker, a very rare bird of India." Blyth seems to have thought it the same.²

The Indian night-jar (*C. Asiaticus*), is found in jungles asleep during the day, coming out at evening with a rapid, low, and noiseless flight, for a short distance, when they alight on the ground, squatting close down.

The Newera Ellia night-jar (*C. Kelaarti*), a large bird of its kind, which swarms on the plains after sunset, was also said to be peculiar to the island, but is identical with the Nilgherry night-jar of Jerdon, a light greyish colour mottled with black and white.³

PASSERES.—*Swallows*.—Three or four of the swallows are confined to the mountain district, among them is the Australian spiny-tailed swift (*Acanthylis caudicuta*), the largest

¹ Birds of Ind., ii. 189; Blyth, J. A. S. Beng., xviii. 806.

² J. A. S. Beng., 1846, p. 283.

³ Kelaart, Jerd. i. 193.

species known, remarkable for its amazing power of flight. They migrate from Australia, and have been noticed at Newera Ellia, always keeping high in the air, but are rarely seen. *Hirundo domicola* is known in the Nilgherries as the Bungalow swallow; they also build in houses at Newera Ellia. *Hirundo hypertyra* is a red-breasted swallow, discovered in 1849, by Mr. Layard at Ambepusse, and supposed to be peculiar to the island; but one has been obtained by Lord Walden from Malacca. "They build a globular nest with a round hole at the top. A pair built a nest in the ring of a hanging-lamp in Dr. Gardner's room at Peradenia, and hatched their young, unscared by the daily trimming and lighting of the lamp."¹

The common palm-swift (*Cypselus batassiensis*) builds a cup-shaped nest containing two eggs, in palmyra palms. In India they are said to be semi-nocturnal in their habits, appearing at sunset, seldom flying far from the palm-trees, and to line their nests with mucus; but the nests were probably mistaken for those of the *Artamus fuscus*.

The black-swift (*C. affinis*) is a migratory bird, forming nests of mud in the rocks at Dambool. In India they build among high pagodas.

A rare swallow (*Hirundo erythropygia*), a Southern Indian species, resembling the red-breasted swallow, but less reddish, only seen in the north, was mistaken for *H. daurica*, a Northern Indian species found in the Nepal. The common swallow of Europe, *H. rustica*, abounds in the maritime provinces, flying over pools and swampy places, often resting in large flocks on the ground.

The most remarkable of the Swifts is the *Collocalia nidifica*, which forms the "edible nest" considered by the Chinese the most *recherche* of all delicacies. It is not exactly known what is the substance these nests are lined with, the outer part being made of grass, moss, &c.; it resembles strings of isinglass of a reddish-white colour and very brittle, tasting, when cooked, like vermicelli. Sir C. Home suggested that they are formed

¹ Layard, Ann. Nat. Hist., 1853.

of a glutinous matter secreted in the mouths of the birds by large salivary glands, which is very probable;¹ some think they are composed of a species of seaweed. Dr. Kelaart says, "they visit Newera Ellia in the spring, and that their nests have been found in a rocky cave in Mount Pedro. The nests are the size and shape of a goose egg, and weigh about half an ounce when the outer part is removed; the best kind, those in which young have not been reared, bring twice their weight in silver in China. A few are sent from Ceylon, being obtained in caves near the sea at Cultura (where the birds resort) by some Chinese, who rent the royalty from Government; but Java furnishes the chief supply. They were first noticed in 1658 by Bontius, in his "History of the East Indies." (Vide Horsfield's "Catalogue").

Kingfishers.—The gural (*Pelargopsis gural*) is rare at Colombo, being more common about the Cultura river, and abundant in the Eastern province, frequenting tanks and swamps, preying on fish, frogs, and small mollusca. This is a large and powerful bird, uttering a loud harsh cry when on the wing; it usually perches on a high branch overhanging water, waiting for a passing fish.

The Smyrna kingfisher (*Halcyon smyrnensis*, Linn.), a white-breasted bird, is common everywhere near rivers, paddy fields, tanks, salt and freshwater marshes, preying on fish, crabs, and beetles, and occasionally seizes butterflies in the manner of the bee-eater.

- The dwarf (*Ceyx tridactyla*), is a lovely little purple bird, with only three toes; found in all parts of the island, although not numerous. "It delights equally in the mountain torrent or the stagnant tank, glancing over them with the velocity of an arrow, its minute form evading the quickest shot."²

The dark-blue Bengal kingfisher (*Alcedo Bengalensis*)—"mal-pillahuda" of the Sinhalese—is found throughout the island, and the most common in the maritime provinces; rather solitary in its habits, perching for hours over some lonely water on a stick stuck in a paddy field or overhanging branch on a river, watching for fish or aquatic insects, "and

¹ J. A. S. Beng., xiv. 210.

² Layard, Ann. Nat. Hist., 1853.

are caught in great numbers, some seasons,* by the Moormen, who send their skins to China for embellishing fans. The trap is a net spread under water covered with horsehair nooses, baited with small fish.”¹

Ceryle rudis, a black-and-white bird: unlike most kingfishers, seizes its prey on the wing, hovering over the water at some height, and falling like a stone on a luckless fish, momentarily disappearing under the surface.

MEROPINA—*Bee-eaters*—are beautiful little birds of a prevailing light green colour, preying on bees, coleoptera, and other insects. Their usual manner of catching them is to station themselves on a tree or old building in watch for a passing insect, on which they dart, seizing them in their bill.

The Philippine bee-eater (*Merops Philippinus*), migrates to the island in numbers in September. In the evenings they hunt for insects high in the air like swallows.

The Indian bee-eater (*M. viridis*), is found in open places of the northern and eastern provinces, delighting in water, over which it hunts for flies, taking them off the surface. Their flight is very graceful, gliding through the air with expanded wings and tail. They roost in large flocks in the same trees for months.

The five-coloured bee-eater (*M. quinticolor*), is found chiefly in the hills of the interior, pursuing insects among the tree-tops, rarely descending to the ground except when breeding, scooping holes in steep banks for their nests.

The Hoopoes—found in Ceylon are said to vary in colour, and have a tendency to assume the Burmah type. They are common about Jaffna during the N.E. monsoon, being partly migratory, and supposed to be the crested Indian hoopoe (*Upupa nigripennis*).

Sun Birds or Honey Birds—are erroneously called humming birds by Europeans in the island, being of a different genus, and having less beautiful plumage, chiefly of a purple or russet colour, with brilliant yellow plumes on each side of the breast, and curved bills, with tubular tongues adapted for extracting honey from flowers. Their plumage is more remarkable for

¹ Lay., Ann. Nat. Hist., 1853. Pillihuda is a general native name for kingfishers.

the peculiar metallic reflections and gem-like lustre than gaudy colouring.

Nectarinia Zeylanica—are most frequently seen in the mornings and evenings hovering over flowers, into which they thrust their long bills in search of minute insects or honey, on which they live, and occasionally seize spiders on their webs. These little birds are pugnacious, often fighting over the flowers, the victor flapping his wings like a game cock, and are very vivacious in their movements.

The short-billed honey-bird (*Nectarinia Asiatica*) builds a dome-shaped nest on the extremity of a twig, over which spiders are allowed to weave their webs, as it conceals the nest from observation. A kind of roof or portico is built over it projecting an inch beyond the sides.

Tickel's honey-bird (*Dicaeum minimum*) is the smallest in Ceylon, frequenting hibiscus and other trees which are covered with parasitic loranthus, feeding on the berries. Its plumage is olive, with a little red on the back.

Warblers and Creepers.—A new creeper, *Prionochilus vincens*, belonging to a Malay group, discovered among the lower Southern hills, is described by Mr. Legge, F.Z.S., in P. Z. S., 1872. It is about four inches long; head, back, rump, and lesser wing-covers, a dull steel blue; greater wing-covers and tail black; chin, chest and throat, white; under parts yellow; red irides, black bill legs and feet. *Dendrophila frontalis* is a charming little blue creeper found on jak trees, creeping in small parties with rapid movements over the branches, examining every leaf in search of insects.

The tailor-bird (*Orthotomus longicauda*) has earned its name from the habit of forming a nest among green leaves by sewing several together, making holes with its bill, and then passing a fibre through them. The nest is afterwards lined with cotton, or some soft substance. The tailor-bird is small, of a pale brown colour, with a long tail, which they are continually jerking upwards as they hop about, being very lively in their movements, and feed much on spiders. They usually select broad-leaved plants to build in, although Mr. Layard has seen a nest formed of a dozen of narrow oleander leaves drawn

together, having a hole in the side. Various substances are used for sewing, the most common being silky fibres of plants. Jerdon says, "They use cotton, but prefer cotton thread when they can get it. He knew one to pounce upon bits of thread during the absence of a tailor who was employed sewing in a verandah" (2, i., 167).¹

Layard's mountain warbler (*Cisticola omalura*), of a dusky black colour, supposed to have been peculiar to Ceylon, is said to be identical with *C. schænicola*, Bonap. They abound in the lemon grass of Newera Ellia and Horton Plains, where they make their nests; and are occasionally found at Galle and Colombo, but are more numerous about Jaffna in gingily fields. When alarmed, they drop down to the roots of the plants. *Drymoica valida* is a similar bird, peculiar to Ceylon, frequenting turfs of grass, and allied to *D. sylvaticus* (2, i., 181), having a light red-brown iris.

The dayal bird, or magpie-robin (*Copsychus saularis*), "polichia" of the Sinhalese, resembles a magpie, and is seldom seen far from habitations, about which it builds in neighbouring trees, and feeds on insects. Mr. Layard relates finding two old birds attacking with great noise a green snake that had coiled itself round one of their young, which was dead, having evidently died from fear.² Mr. Sclater, in the P. Z. S., 1871 (186), adds a variety of the above *C. Ceylonicus* to the ornithology of the island. It is similar to *C. brevirostris*, Blyth, of India.

The Indian or sooty robin (*Thamnobia fulicata*), of the low country, a popular favourite and pleasant songster both in Ceylon and the Peninsula, is also found about habitations, perching on house-tops and fences, constantly elevating its tail over its head. They have a few red feathers in the tail.

The Newera Ellia robin (*Pratincola atrata*), a melodious songster, was supposed to be peculiar to the island, but Jerdon says it is the same as the Nilgherry robin; a very familiar bird in its habits, making a nest of moss in banks.³

The best song bird in the island is the long-tailed thrush

¹ Lieut. Hutton, J. A. S. Beng., ii. 502.

² Ann. Nat. Hist., 1853, p. 263.

³ v. 2, part 1, 124.

(*Kittacincla macroura*), the "shama" of India, which is solitary in its habits, frequenting dense jungles in the upper country, singing in the mornings and evenings. In India it is considered superior to the nightingale, and kept in cages at Calcutta.

The white-eyed bush creeper (*Zosterops palpebrosus*) is common in the south, creeping in small parties over flowers, searching for insects. Mr. Holdsworth introduces a new creeper, very numerous at Newera Ellia, *Z. Ceylonensis*, closely resembling the preceding, olive green on the back, yellow neck, white under-parts.

Iora Zeylanica and *I. tephia* are little black and yellow birds, whose plumage varies considerably, the head and wings being usually black. They have a clear bell-like note, and have been called the yellow "bul-bul."

Wagtails.—The yellow wagtail of Europe (*Motacilla sulphurea*), common in jungle streams of the Nilgherries, migrates to the island, which, along with the Tit (*Parus cinereus*), and two other *Motacilla*, are found in all parts of Ceylon, near shallow rocky streams, picking up insects. The black-breasted Indian wagtail (*Motacilla Indica*), called "gomarita" or dung-spreader by the Sinhalese, is a charming little bird, found in shady places, searching cattle dung for insects. Several species of *Anthus*, or titlarks, called skylarks in Ceylon, from their rising in the air in a similar manner, are common all over the island. The tree pipit (*Corydalla striolata*), is found in flocks among ravines and edges of tanks.

Thrushes.—This family are less numerously represented in Ceylon than India, several Peninsula birds being absent, among which is the white thrush. The most common is *Pitta brachyura*, a short-tailed thrush, called "Avitchia" by the Sinhalese, abundant in the maritime provinces. *Alcippe nigrifrons* is a black and brown coloured species, peculiar to the island, found in low jungles bordering ravines, and closely allied to *A. atriceps* of India. The spotted thrush (*Oreocincla spiloptera*), found only in the mountains, is also peculiar to Ceylon, as well as the Newera Ellia black-bird (*Turdulus Kinnesianii*), which is a jet black, with yellow legs, very numerous at

the Sanatarium. There are also hill black-birds in India. *Merula simillima* of the Nilgherries is very like the above, only of a smaller size;¹ and Ward's thrush (*Merula Wardii*) is another common to both places, distinguished by a white streak near the eye, a white patch on the wings, and pale under-parts.

Oreocincla Nilgirensis, a mountain thrush, is a general black colour mixed with olive. Each feather pales near the end, terminating in a black colour, which gives the bird a scaly appearance. It was supposed to be peculiar to Ceylon.²

Dumetia Albogularis is called the "pig-bird" in India, from its habit of creeping under dense jungles. In Ceylon it is almost confined to the cinnamon gardens about Colombo.

Orioles—called mango birds by Europeans in India, and "kacooralla" or yellow birds by the Sinhalese, present two varieties in Ceylon. The black-headed species (*Oriolus melanocephalus*), is very abundant in most parts, their brilliant orange plumage quickly attracting attention to them as they flit from tree to tree. There are two species of *O. melanocephalus*, one found in Bengal having the head and the whole of the breast with the wings black, the other, found in Malabar, Southern India and Ceylon, the *O. Ceylonicus* of Bonaparte, only black about the head, neck and wings.

The golden oriole (*O. Indicus*), the "kindu" of India, is rare in Ceylon. The oriole occasionally visits England in the summer, but, as the "Field" remarks, the gaudy plumage of the male bird, and the charmingly melodious but melancholy whistle, is too attractive for their safety, being immediately shot for museums.

Babblers—are a gregarious and noisy family of birds, continually chattering like magpies, usually of a pale brown colour, and obtain their food on the ground, searching the dung of cattle for insects, hence they are also called dung-thrushes. Several species are found in Ceylon. *Malacocercus striatus* are called the "seven brothers" by the natives, from there being usually that number of them together. When perched on a tree they follow each other in succession; first, one drops on the ground, then another, and so on to the last. The

¹ Birds of Ind., i. 524.

² Layard, Ann. Nat. Hist., 1854.

Hindus likewise apply the term "sat bhai" (seven brothers), the Bengal babbler.

Pycnontidae—are numerous in Ceylon and India, where they seem to be erroneously called bul-bul, or nightingale, by Europeans, as none of them sustain the reputation for song of the nightingale of Europe (*Sylvia luscinia*). The term has also been applied to *Iora Zeylanica* and *Phyllornis Malabarica*; however, the true bul-bul of Persia is said to be one of the *Pycnontidae*. According to Pallas, it is the *Sylvia luscinia* which the Armenians call "Boul-boul," and the Crim Tartars "Byl-byl." The Himalaya bul-bul (*Hypsipetes psaroides*) is also called the jungle-goat, a name that does not indicate much of a songster, and certainly the Indian birds must be inferior to that of Iran, "the bird of a thousand songs," if we are to believe the Persian poets, and which Kazwini says has such a passion for the rose it cries when it sees one pulled.¹

The most numerous in Ceylon is the *Pycnonotus hæmorrhous*, called by the Portuguese Kondatchee; and "kowekoralla," or top-knot bird, by the Sinhalese, from the crest on the head of the male. They are trained from the nest by the natives to fight, being considered by them the most game of all birds, sinking from exhaustion rather than release their hold of an antagonist. Kelaart's yellow-eared Newera bul-bul (*P. penicillatus*), was supposed to be peculiar to Ceylon, but Jerdon says he has seen a similar bird in Mysore. The head is brown, and the feathers have a scale-like appearance.

Fly-catchers.—*Myiagra cærulea* is a lovely little blue bird found in flocks all over the island. It is said in India to dart into water like king-fishers after aquatic beetles.²

Tchitrea Paradisi—is named "kadde hora," cotton thief, by the Sinhalese, from the two long, narrow, black-shafted, white feathers in the tail. Their plumage about the head, neck and breast is black, the remainder being white. They are restless in their habits, flitting from branch to branch in search of insects, whisking their long tails over their heads with a harsh

¹ Ousley, Orien. Coll. i. 16; Pennant's Brit. Birds, i. 494. The British name is derived from night-galan, Saxon, "to sing at night."

² Ann. Nat. Hist., 1853.

cry, and are very numerous in the South. The plumage of this bird, which is found all over India, from the Himalayas to Ceylon, is subject to change; at some seasons the white feathers become brownish, and are then called "gini hora," fire thief, by the natives. It is called by the Europeans the Ceylon bird of paradise. There are, however, no real birds of paradise in the island, being almost peculiar to the Archipelago. Nicolo di Conti states they had no feet, and it was long believed in Europe that such was the case, which idea may have arisen from the circumstance of the natives cutting the legs off the skins they used as ornaments. Pigafetta mentions that the King of Bachan, one of the Moluccas, gave a pair of them to Magellan as a gift for the Emperor, Charles V. The name was given by the Malays, who say such beautiful creatures could only come from heaven.

Layard's fly-catcher (*Butalis muttui*) is a handsome and rare bird, with rufous and white plumage, supposed to be peculiar to Ceylon, but Jerdon says it is identical with *Alsecomax ferrugineus* of Nepal, which occasionally migrates to the plains in cold weather. Its presence in Ceylon was probably accidental, only one having been found at Point Pedro by Mr. Layard.

Pericrocotus Perigrinus is a pretty lively bird, with a crimson rump, frequenting thick jungles, ever active in pursuit of flies; and *P. flammeus* is a larger variety, found in flocks in the higher jungles.

Jerdon adds two fly-catchers to the ornithology of the island, *Ochromela nigrorufa*, found in the highest parts, also in the Nilgherries; the head, wings and back are black, and the rest orange; the other, *Erythrosterina Leucura*, has head, back and wings a grey olive brown; the tail, which is a darker tint, has four of the outer feathers on each side white, broadly tipped with brown. In spring, the male bird becomes rufous about the chest.¹ Mr. Holdsworth thinks Jerdon has mistaken it for *E. Hyperythra*, some specimens of which have been obtained at Newera Ellia.

Two birds, quite new species, have been recently added by Viscount Walden; *Glancomyias sordida*, an ashy grey colour,

¹ Birds of Ind., i. 460, 462, 481; J. A. S. Beng., xvi. 473, xv. 291.

with a faint tinge of blue, forehead and shoulders deep blue, under-parts white, resembling *G. melanopus*, for which it appears to have been mistaken by Dr. Kelaart. *Geocichla Layardii* has head, neck, and under-parts a deep orange, back a blue grey; they are found in the South-east hills.¹

Shrikes.—*Artamus fuscus*, a slate-coloured bird with a rufous breast; catches flies on the wing like swallows; frequenting cocoa-nut and palmyra palms, where they build their nests, lining them with mucus, and are very active in pursuit of insects during toddy drawing, who are attracted by the sweet liquid.

Most of the shrike family are fond of lofty trees, where they make their nests of roots and grass, and pounce from their high perches on passing insects. They are also found on the backs of cattle searching for ticks, and habitually pursue crows. Some of them are called butcher birds, from a supposed habit of impaling live insects on thorns and then eating them piecemeal, but this is denied. Jerdon says he did not hear of any instance where they practised it in India, and Layard mentions that he never saw them do so in Ceylon.² "It is a popular idea in England that the red-breasted shrike impales insects on thorns."³

Dicrurus minor is a small black species common about Colombo, also *D. leucopygialis*, which is thought to be peculiar to the island, where it is called the Ceylon king crow, from their habit of chasing every crow they see. They perch on cocoa-nut trees, and if one comes near he is instantly pursued. This bird is very similar to *D. caeruleus*, the Indian king crow, which is rarely seen in the island.

Tephrodornis affinis is called the Ceylon grey-backed butcher-bird, and supposed to be peculiar to it, but as it is migratory, arriving in October, it is probably the grey-backed shrike of Nepal (*T. Indica*).

Irena puella,⁴ a lovely blue shrike of Malabar, is occasionally seen about Kandy, frequenting lofty and dense jungles.

¹ Ann. Nat. Hist., 1870, pp. 218, 416.

² Ann. Nat. Hist., xiii.; Horsf. Cata., p. 130.

³ Wood, Nat. Hist., p. 372.

⁴ Hodgson's Cata., p. 99.

Crows, Jays, and Starlings.—Layard's *Cisla puella* was supposed to have been first discovered by himself, but a specimen from Ceylon was previously described and named by Wagler. It is a beautiful bird with deep blue and red-brown plumage and red legs, found among the ravines of Newera Ellia and other places, and peculiar to Ceylon.

The common carrion crow is abundant everywhere ; also the Indian crow (*Corvus splendens*), which frequents the towns of the sea coast in great numbers, where they are very useful in their way, performing the part of scavengers. Heavy fines, it is said, were imposed by the Dutch on any one who shot them. The immunity they enjoy from molestation renders them perfectly indifferent to the presence of man ; endless stories are told of their incredible audacity and thieving propensities. The doors and windows of houses being open all day, they avail themselves of it to walk into the rooms and steal any article they take a fancy to, or food incautiously left in their way, and have been known by a sudden swoop to take things off a breakfast table while a person was seated at it. They are equally impudent in India. Linschoten, speaking of them at Cochin, says, " they fly in at the windows and take meat off dishes—one picked the cotton out of his ink-horn, and blotted his paper before him." They betake themselves every evening to the lakes about Colombo, splashing and washing in the water before retiring to roost in the cocoa-nut and other trees of the suburbs, returning to their town haunts at daybreak.

The largest and most beautiful of the Maynahs (*Eulabes ptilogenys*) is supposed to be peculiar to Ceylon, and much prized by the natives, who keep them in cages, on account of their being able to speak a few words. They are a deep purple about the head and neck, with yellow ear lappets, and fly in flocks perching on high trees, occasionally alighting on the backs of cattle in search of ticks. *Eulabes religiosa* is called the Brahmin maynah.

Pastor roseus, a very beautiful rose-coloured starling, with dark wings and head, is found in large flocks at Point Pedro, Putlam, and some other places on the northern coasts, in July. They are birds of passage, remaining only a short time.

Heterornis albi-frontata of Layard's list is said to be identical with *Temenuchus senex* Temm., described by Bonaparte as a native of Bengal, but it is peculiar to Ceylon. The general colour is black, with a white forehead and throat.

Finches.—The nest of the weaver-bird (*Ploceus baya*) rivals that of the tailor-bird in its ingenuity, being a marvel of skill. Usually made of grass or fibres and attached to the end of a branch or frond of a palm-tree, in shape it is something like an inverted retort, having a tubular entrance from below. The female gets inside during part of the work to draw in and interlace the fibres pushed through by the male bird. When the nest is finished lumps of clay are stuck on outside, about which there are many theories, the original idea derived from the Hindus being that the clay is used to stick on fire-flies to light up the inside of the nest. Jerdon disbelieves this, and is of opinion it is used to give weight to the nest to prevent its being blown about by the winds from its pendant position; six ounces of clay have been found on one. The Sinhalese make the same statement about the fire-flies, but neither Layard, or any other European, has ever seen any of these insects sticking to the clay. During the time of incubation the male occupies a separate nest. The weaver-bird is something like a sparrow, with a few yellow feathers on the back. An account of its nest by Akbar-ali-Khan, of Delhi, is given in the Asia. Res. ii. 109.

Ploceus manyar, a Java bird, entered in Layard's list, is said not to be found in Ceylon. It was probably mistaken for the Indian weaver (*P. striatus*); however, all the weavers are migratory.

A few specimens of *Estrelda amandava* have been recently found wild about Colombo, and a *Munia rubronigra*, a northern Indian finch at Galle; they are supposed to be descended from some imported in cages and which had escaped into the jungle.

The familiar sparrow of Europe is represented by his Indian namesake *Passer Indicus*, common everywhere, and larks by the Indian skylark, *Alauda gulgula* and *A. Malabarica*, a crested species. The finch-lark (*Pyrrhulauda grisea*), is a curious little bird, found on the open plains and cultivated grounds,

visiting Ceylon in flocks during the cold season, but do not build their nests in it. They make a short flight upwards and then fall, repeating the operation at intervals.

Hornbills.—These singular birds are allied to the Toucan, having an immense beak, six or seven inches long, with an extraordinary excrescence on the top of it, which is of a grey colour, while the bill is yellow and black; naturalists are puzzled to explain the use of this odd appendage, which would seem to be an incumbrance, but such is not the case, as, being hollow, it is very light. They live principally on fruit and berries, which they swallow whole, tossing them in the air and catching them in their bills; when fruit adheres firmly to a stalk they take it in their bills and throw themselves from the tree in order that their weight may pull it off the branch, and are said to be fond of the fruit of the *Nux vomica*, being called “kuchla” in some parts of India from this circumstance. Sir E. Tennent says they “eat small snakes and reptiles,” but this does not seem to have been noticed by any other observer of their habits.

Buceros pica is a very large piebald bird, having its black plumage varied with four white feathers on each side of the tail, and some have been observed of a violet hue. (*B. violaceus*, Shaw), supposed by him to be a distinct species, but it seems to be only a variety. They have a loud harsh cry, and are found in most parts of the island in small parties flying in line, with alternate heavy strokes of the wing and a gliding movement on outstretched pinion.¹ “The Sinhalese say the male bird builds up the nest with mud round the female when she is sitting on the eggs, leaving only an aperture for her head, as a precaution against monkeys,” which appears to be true, as it is a habit of the hornbill family, having been observed by ornithologists in Burmah, Java, and India; Captain Tickell says he saw one build up a nest.²

B. gingalensis is a small grey species, found in the lower

¹ Layard, Ann. Nat. Hist., 1853.

² Jerdon, ed. 1862, vol. i. p. 242-4; Mason’s “Burmah”; Horsfield, Zool. Res. in Java; Baker, J. A. S., 1859, p. 292; Asia. Res. v., xviii. 185, xv. 184-7; J. A. S. Beng. 1855, p. 279.

southern hills. Holdsworth says it is a variety peculiar to Ceylon, and has been confounded with *B. griseus*, which Jerdon places in the island; according to Blyth, *B. gingalensis* is only found in Ceylon and Malabar.¹

SCANSORES. *Parroquets*. — There are no real parrots in Ceylon, parroquets being the only genus of "Psittacida" found in the island, multitudes of the small green parroquet, *Paleornis Alexandri*, named after the great conqueror, during whose time they were first brought to the West from India, frequent the jungles of the lower country, where vast flocks of them are seen in the early morning rushing through the air above the trees with extraordinary velocity, accompanied by loud screaming and deafening din, the very epitome of exuberant excitement. Towards evening they settle on the trees to roost, in the same noisy manner, being comparatively quiet during the heat of mid-day. A part of Ceylon, north of Colombo, is called the parrot country, from the immense numbers who resort in the evenings to the trees that line the sea-shore, and their screams are so loud as to overpower all other sounds.

There are several varieties of the green parroquet (*P. torquatus*), with a rose-coloured ring on the neck; *P. cyanocephalus*, an ashy-headed bird, and *P. Calthropæ*, which is peculiar to Ceylon, a very handsome bird with a purple head, frequenting the mountains about Kandy and Newera Ellia in flocks, perching on the highest trees. Holdsworth adds another variety, *P. rosa*, which he says is not uncommon in the south; bill yellow above, black below, irides buff, feet greyish.

Lord Walden has pointed out (P. Z. S. 1867, 467) that the *Loriculus Asiaticus*, Lath., a smaller parroquet, having the crown of the head a deep red, passing into a saffron hue on the nape, although described as an Indian bird, is peculiar to Ceylon.

Barbets and Woodpeckers. *Megalaima Zeylanica*, a large brown and green barbet, is the commonest being found everywhere, feeding on berries and fruit, building in the hollows

¹ P. Z. S., 1872, p. 425; Jerd., ed. 1862; J. A. S. Beng., 1847, p. 996, 1000.

of trees; Holdsworth says it is peculiar to Ceylon. The large red-headed and green-backed barbet (*M. Indica*) "mal kuturu" of the Sinhalese, is generally known in Ceylon and India as the "copper-smith," its cry resembling the hammering of a caldron. The small red-headed barbet (*M. rubicapilla*), peculiar to Ceylon, is very common about Colombo, Jaffna, and the eastern coast.

Picus gymnophthalmus, Layard's woodpecker, is the smallest of the tribe in the island, and not numerous; they are fond of climbing jak trees, and have black and white plumage, a yellow iris, and purple eyelids.¹

Gecines chlorophanes, a green, red-headed bird, is seen about Colombo and the lower hills—often found on the ground breaking cattle-dung in search of insects, a peculiar habit. When alarmed they fly to trees, creeping up the trunks with great rapidity.

Brachypternus aurantius, an orange-backed woodpecker, is called the "carpenter" by the Portuguese, and is said to be only found in the northern parts of the island, "its loud knocking of palm trees resounding in every Palmyra tope of the Jaffna peninsula."²

The Ceylon woodpecker (*B. Ceylonicus*) is abundant in the lower country; the back and wings are a dull crimson; it is doubtful if this is a distinct species, or only a variety of *B. Stricklandii*, a rare scarlet-backed bird with brownish wings, buff breast and neck, the rest being a maroon; there are some scarlet feathers in the tail, and the head of the male bird is scarlet.³

Cuckoos abound in the island, fourteen species being found in it. Their habits are the same as in England, depositing their pale greenish eggs in the unguarded nests of other birds, where they are fostered, the young intruders often ejecting the lawful possessors. Crows have a great antipathy to them, which may be accounted for from the cuckoo showing a preference for their nests. The Indian Koel is very partial to

¹ Birds of Ind., i. 278, App. 871. Barbets are allied by some to kingfishers.

² Layard, Ann. Nat. Hist., 1854, p. 449.

³ J. A. S. Beng., xv. 282, xvi. 464.

crows' nests, and the Hindus believe that the crow, discovering the imposture when the young intruder has grown a tolerable size, ejects him from the nest, but Jerdon doubts this story. The Sinhalese say the cuckoo's plaintive cry is a petition for rain, as they can only swallow drops of water.¹

The Indian Koel (*Eudynamis*), or greenish-black Oriental cuckoo, is the most common in the maritime provinces, particularly during the north-east monsoon. The Philippine cuckoo (*Centropus rufipennis*) is called the jungle crow by sportsmen, the "kokoola" of the Sinhalese, their general name for all. They feed on insects, marching over the ground with a spreading tail and pompous air, flying to trees when alarmed. The common European cuckoo (*Cuculus canorus*) is the rarest of all. Two are peculiar to the island, *Centropus chlororhynchus*, a yellow-billed species with deep brown plumage; and a green-billed malkoha (*Phenicophæus pyrrhocephalus*), with rich plumage, found in the southern mountains. Holdsworth speaks of an emerald cuckoo (*Lamprococcyx maculatus*), *C. xanthorhynchos* of Kelaart, having been seen in the island.

Pigeons and Doves.—Few Europeans not naturalists have any idea of the beauty of some Indian pigeons, the *Treron* or *Osmotreon* genus, are remarkable for their green plumage and graceful shape. The parrot pigeon, or green dove (*Osmotreon bicincta*), "batta goya" of the natives, is very abundant in the south and west, they are never seen on the ground, frequenting the highest trees in flocks, and make a rude nest of sticks; they are very shy and live on berries. *O. flavogularis* is a handsome yellow-breasted bird, and *O. Pompadoura*, a small species of Pompadour pigeon peculiar to Ceylon, very like the above only a little smaller.

T. chlorogaster, a large green bird, is only seen in the north, coming in great numbers from India at times and then returning. *Carpophaga Torringtonia* is a large wood-pigeon peculiar to Ceylon, of a slaty colour, flying high, first described by Dr. Kelaart, but was well known to residents at Newera Ellia long before. It frequents the valley at particular

¹ D'Alwis "Sidath Sangara," p. civ. ; Sir E. Tennent in his Nat. Hist. Cey., p. 244, applies this to the hornbill.

seasons in great numbers to eat berries, and is allied to *Palumbus Elphinstonii*, the Nilgherry wood-pigeon.

C. pusilla, "mahavilla goya" of the Sinhalese, a small hill dove, migratory in the mountain region, feeding on fruits, was thought to be peculiar to the island, but it is the same, according to Jerdon, as *C. sylvatica*, the green imperial pigeon of the Nilgherries.

The season pigeon (*Albocornus punicus*) is a migratory purple dove, called "kurundu-cobcya" by the natives, from its frequenting the cinnamon gardens to eat the berries.

Turtur risorius, a grey coloured turtle-dove, is very common in the north, and *T. Suratensis* in the central and southern jungles. A very handsome bronzed-winged ground pigeon, *Chalcophaps indicus*, is found about Colombo and southern jungles, a bold bird, very strong and swift on the wing, flying low.

L. Bonaparte has *Macropygia macroura* from Ceylon, a dove of a dusky black colour; but Lord Walden has shown he was mistaken in making Ceylon the habitat, as it is a native of Senegal, and was figured by Buffon under the name of *Turoco* (xi. 553).

The Indian blue rock pigeon (*Columba intermedia*) is found in great numbers on Pigeon Island, near Trincomalee, where they make their nests in crevices among the rocks, but are not common in other parts of the island.

GALLINÆ.—The splendid peacock (*Pavo cristatus*), "monara" of the Sinhalese, is rarely seen elsewhere than on the open plains of the eastern province, in flocks of from twenty to thirty, but generally in pairs. Their numbers have greatly diminished of late through wanton destruction, their flesh being hard and indigestible. They are most often seen in the morning drying their plumage in the sun, retiring during the day into the jungles, where they build their nests in trees. It is said they eat great quantities of snakes, the scarcity of these reptiles in the eastern province being attributed by Mr. Bennet to the pea-fowl, who destroy them. Jerdon says pea-fowl in India will eat snakes when kept in confinement, but not when wild. Knox relates that the natives used to catch them

in wet weather with dogs, as their immense tails became too heavy from the rain to let them fly.

Sir E. Tennent, alluding to the European fable of the jack-daw borrowing the plumage of the peacock, says it has its counterpart in Ceylon, where the popular legend runs that the pea-fowl stole the plumage of a bird called by the natives "avitchia," which utters a cry resembling the word "neat-kiang," which means "I will complain," addressed to the rising sun as a plaint. He adds, "I have not been able to identify this bird described as smaller than a crow, with mingled red and green plumage."¹ The bird named "avitchia" by the natives is a short-tailed thrush (*Pitta brachyura*); its absence of tail may have given rise to the story.

The jungle-fowl of Ceylon is said to be a different species from that of India, being distinguished by a dark purple spot under the chin and neck. They bear a strong resemblance to the barn-door and game fowl, with red hackle, and are often seen in the morning on roads in the interior, but are usually found in dense jungles. They rear coveys of from six to seven, and hybrids, from their mixing with domestic poultry, are found in native villages, but chickens reared from their eggs by tame fowl rarely live. Their short, shrill crow is often heard in the clear air of the morning, echoing through the ravines of the interior. They are very migratory in their habits, flocking in great numbers to Newera Ellia and other places when the "nillo," which is a septennial, ripens, to eat the seeds, on which they become amazingly fat and plump. At these seasons they are the most delicious of all game, and easily shot when pursued by dogs, as they fly into the trees, and remain to be fired at one after the other. Spaniels are the best for this sport. It is said that jungle-fowl become stupified and blind from eating the nillo, but there does not seem to be much foundation for this statement.

"A female of the Ceylon jungle-fowl was figured in "Gray's Ind. Zoo.," under the name of *Gallus Stanleyii*. The cock bird was subsequently named *G. Lafayette*, by Lesson, but its habitat was unknown until a specimen was sent to

¹ Nat. Hist. Cey.

Mr. Blyth from Ceylon.”¹ The Indian bird *G. Sonneratti*, which inhabits Southern India, was first made known by the traveller Sonnerat.

The double-spurred partridge (*Galloperdix bicalcaratus*), common in deep jungles of the south and west, is said to be peculiar to Ceylon; they are caught by the natives with nooses. There is a double-spurred partridge (*G. Spadicus*) in India, a kind of mongrel jungle-fowl, which is very like it. Blyth speaks of a second species of jungle-fowl in Ceylon (*G. lineatus*), which was probably a hybrid.² The Pondicherry partridge (*Francolinus Ponticerianus*) is most common on the sandy jungles of the North.

The Chinese quail (*Coturnix Chinensis*), and one or two varieties of the Indian quail (*Turnix taigoor*), are rather common in the south, among grass and dry paddy fields, and are occasionally seen in the cinnamon gardens.

GRALLÆ.—The Goa sand-piper (*Lobivanellus Goënsis*), and *L. bilobus* are very abundant. The plovers are all birds of passage, among which is *Charadrius fulvus*, and the Philippine plover, very common in the salt-pans of the south-eastern coast. The turn-stone (*Streptopelia interpres*) is also seen occasionally, a little black and white bird, found all over the world.

Herons.—The purple heron (*Ardea purpurea*) is usually found along the edges of rivers, preying on fish. *A. cinerea*, the common blue heron, is rare. *A. Asha* is more plentiful, building their nests in trees near water. *A. alba*, the great white egret, is not a common species. *A. bubulcus* is called the “gehu-koka,” or cattle-keeper by the Sinhalese, being a common attendant on cattle in the lower country, picking up insects and grubs disturbed by them, and occasionally perching on their backs; they also eat fish.

Ardeola leucoptera, the common paddy-field heron, is abundant in marshes and paddy-fields, standing motionless on their embankments, watching frogs who come within their reach. Their backs being dark, the white plumage is only seen when they are flying, hence the Tamils say they are like deceitful men, only showing their true colours occasionally.

¹ Tennent, Nat. Hist. Cey., p. 245.

² J. A. S. Beng., 1847, p. 211.

Ardetta Annamomea is a pretty light brown bird, common in the south; also, the smallest of the herons, *A. Sinensis*, which frequents rivers. *Butoroides Javanica*, the green bittern, is very abundant in the north, preferring salt-water marshes. The white spoon-bill (*Platalea leucorodia*) is common in the eastern province, also the night heron (*Nycticorax griseus*), "ra-kana-koka" of the natives, which usually leaves its roost among high trees in the evenings and wings its way to marshy feeding grounds. *Tigrisoma melanolopha* is a rare and curious bittern, said not to be found in India but in Arracan. It has a strange oblong eye, with a yellow iris, and crest on the head; the legs and bill are green, with yellow claws.

Storks.—Holdsworth "doubts if the gigantic Australian black-necked stork (*Mycteria Australis*) recorded by Layard is found in Ceylon." It is, however, a bird of passage, and has been seen in the Nepal. The Calcutta adjutant (*Leptoptilus argala*), which is said to furnish the Marabou feathers, has not been remarked in the island, but the small pouchless adjutant (*L. Javanica*) has been occasionally seen in the north, and probably migrates. The large violet-headed stork (*Ciconia leucocephala*), called "Padre koka" by the natives, from its black plumage and white neck, and the white stork (*Anastomus oscitans*), are common in marshes and about the northern tanks, stalking along their margins, eating the large snails found there. The first of them is named the "beef-steak bird" in India, its flesh resembling the British dish.¹

Ibises—are chiefly found about the northern tanks, living on fish, snails, frogs and other small reptiles. The white-headed ibis (*Tantalus leucocephalus*, Forst.), having a red feather in the tail, is usually seen in flocks. *Geronticus melanocephalus* resembles the sacred bird of Egypt (*T. religiosa*), having a black head. Many reasons have been assigned for the veneration of the ibis by the Egyptians. Herodotus says it was because they destroyed winged serpents. M. Savigny says they venerated the bird on account of its announcing by its arrival the over-

¹ The following strange statement appears in Figuiet's work on birds—"Cassowaries (*Struthio casuarus*, Linn.), are plentiful in the vast forests of Ceylon," Eng. Trans., p. 39.

flowing of the Nile. According to Bruce the Arabs of the present day call them "Abu hannes," or "father John," from their generally making their appearance on the Nile about St. John's day. Maurice, in his appendix to the "Ruins of Babylon," gives some very far-fetched reasons for this veneration.

Scolopacideæ.—Many varieties of this family frequent the seashores and marshes, picking up worms and small marine grubs. Among them are curlews, sand-pipers, long-shanks, and green-shanks. The broad-billed limosa (*Limicola platyrhyncha*) is found all over the island, where mud and water are to be had. The brown-banded whimbrel (*Numenius phæopus*) is considered equal to wood-còck (*Scolopax rusticola*), which are rarely seen in Ceylon. At Newèra Ellia, and the higher regions, snipe come down with the north-east monsoon, being found after the rains in marshy places. In the rice-fields and swamps of the lower country they are much more numerous. During the great heat of mid-day they retire into the woods that border the marshes. Several species are found in the island but the Indian snipe (*G. stenura*), which is abundant everywhere, is the only one positively identified.

The Chinese jacana (*Hydrophasianus Sinensis*), a species of screamer, called "balla-saara" by the natives, is a curious bird, with long, thin legs, very abundant about tanks, and some are found near Colombo. They fly strong, rising high in the air.

The Ceylon rail (*Porzana Zeylanica*) arrive with the N.E. monsoon in numbers, quite exhausted from fatigue, many dropping on the ground. It is uncertain where they come from. Several varieties of rails and water-hens abound. "The red-tailed gallinule (*Gallinula phanicura*), as described by Jerdon, in India appears to differ from that in Ceylon, which has a green bill, brown iris, yellow legs, white face and forehead, resembling the Malay species."

Anseres.—Small flocks of scarlet flamingos (*Phœnicopterus ruber*) are seen about the north-eastern shores and lagoons, and are said to be migratory, arriving in November. Their general plumage is a very pale rose-colour, and the under part of the wings are crimson, but are only seen to advantage when

flying. They have a habit of stalking through swamps in single file, at regular distances from each other, in pursuit of fish, and beat the air with a very loud noise as they rise on the wing. Mr. Layard says the Tamils call them "Inglis koka," their red plumage resembling the dress of English soldiers.

Sir E. Tennent implies that they breed in trees, but other naturalists say they make a pyramidal nest of mud on the ground. Jerdon knows of no instance where they nidificate in India, and it is doubtful they do in Ceylon. However, it is said they breed at Hambantotta.¹ According to Pliny flamingos' tongues were a Roman luxury.

The well-known snake-necked bird of India (*Plotus melanogaster*), a kind of darter, is common on the tanks, as well as the dwarf shag (*Graculus pygmaeus*), called "dia kawa" by the natives, and the lesser cormorant (*G. Sinensis*), having a black head and neck, with bronze-coloured back and wings.

Vast flocks of gargany teal (*Querquedula circia*), are found on the low grounds about Jaffna, arriving during the North-East monsoon. Great numbers of them are shot by the natives, with the aid of buffaloes, "who are trained for the sport, by means of a couple of ropes attached to their horns, answering the purpose of reins, a slight pull turning the animal right or left. The shooter thus guides him forward, keeping on the off-side until he gets quite near his game, when he rests his rusty musket on the buffalo's back, and fires."² Other kinds of water-fowl are shot in the same way.

The little grebe (*Podiceps Philippensis*) is found on tanks and rivers in small parties, living on fish and snails. The Indian hooded gull (*Xema brunnicephalus*), and the gull-billed tern (*Gelochelidon Anglicus*), are common on the sea-shore all round the island. The orange-billed tern (*Scena aurantia*) is found in vast flocks, and the *Atagen Ariel* is occasionally seen off the coasts. This is the frigate-bird of the mariners, which hovers over vessels in the tropical seas at immense altitudes for days together, being possessed of amazing power of wing and endurance.

¹ Nat. Hist. Cey., p. 264 ; Jerdon, Birds of Ind., vol. ii. 777.

² Layard, Ann. Nat. Hist., 1854, pp. 268, 269.

The Oriental pelican (*P. Orientalis*) is common on the eastern coast, although their favourite haunts in the day-time are salt marshes and mouths of rivers. They leave them in the evenings to roost inland, making their nests, which are nearly flat and rudely formed of sticks, among the lower branches of tall trees on the sides of lagoons and tanks, and generally contain three eggs. Some ornithologists say, although they are the only web-footed birds who can roost in trees, they do not make their nests in them.

Pelicans have greyish-white plumage and large bills, the under one being furnished with a pouch in which they carry fish; when these are well filled with prey they retire to some quiet place to eat them at their leisure.

LIST OF CEYLON BIRDS.

The great majority of the names in this list are taken from that of E. L. Layard, C.C.S., and Dr. Kelaart. Those marked * are up to the present peculiar to the island; the additions and new species are indicated by †, and those rarely seen or doubtful by ‡.

- | | |
|---|---|
| <i>Aquila bonelli</i> , <i>Temm.</i> (Nisaetus bonelli of Holdsworth's list.) | <i>Haliastur indus</i> , <i>Bodd.</i> |
| <i>pennata</i> , <i>Gm.</i> | † <i>Pernis ptilorichynchus</i> , <i>Temm.</i> (<i>P. cristata</i> , <i>Jerd.</i> from Holdsworth.) |
| <i>Limnaetus cristatellus</i> , <i>Temm.</i> (<i>Spi-zaetus limnaetus</i> , <i>Horsf.</i> of Layard's list,) a spotted hawk eagle. | <i>Milvus govinda</i> , <i>Sykes.</i> |
| <i>Nipalensis</i> , <i>Hodg.</i> (<i>Spizaetus Nipalensis</i> of Layard's list.) | <i>Falco peregrinus</i> , <i>Gm.</i> |
| <i>Neopus Malayensis</i> , <i>Renn.</i> (<i>Ictinaetus Malayensis</i> of Layard's list,) the black Malay eagle. | <i>perigrinator</i> , <i>Sund.</i> |
| <i>Spilornis bacha</i> , <i>Daud.</i> (<i>Hæmatornis cheela</i> , <i>Lath.</i> of Layard's list.) | <i>Hypotriorchis chicquera</i> , <i>Daud.</i> of Layard's list, probably mistaken for <i>H. severus</i> , <i>Horsf.</i> , Holdsworth. |
| † <i>Pandion haliaetus</i> , <i>Linn.</i> (In Lord Walden's collection, Holdsworth.) The osprey. | <i>Tinnunculus alaudarius</i> , <i>Briss.</i> |
| <i>Pontoaetus leucogaster</i> , <i>Gm.</i> (<i>Polioaetus leucogaster</i> of Holdsworth's list.) | † <i>Buteo desertorum</i> , <i>Daud.</i> |
| <i>ichthyaetus</i> , <i>Horsf.</i> (<i>Polioaetus ichthyaetus</i> of Holdsworth.) | <i>Baza lophotes</i> , <i>Cuv.</i> The coney falcon. |
| | <i>Elaeus melanopterus</i> , <i>Daud.</i> , a black-winged kite found in the hills, an African species. |
| | <i>Astur trivirgatus</i> , <i>Temm.</i> |
| | <i>Micronisus badius</i> , <i>Gm.</i> (<i>Accipiter badius</i> of Layard's list.) |
| | <i>Accipiter virgatus</i> , <i>Temm.</i> , a hawk with dark blue bill and yellow |

- feet (only one specimen of *A. nissus*, *Linn.*, a black and red kite of Nepaul, entered in Kelaart's list, has been seen in the island.
- Circus Swainsonii*, *Smith*.
cinerascens, *Mont*.
melanoleucus, *Gm*.
†æ ruginosus, *Linn.*, a species of moor buzzard, probably migrates, very rare.
- *Athene castanotus*, *Blyth*.
†Athene brama, *Temm.*, added by Jerdon.
- †Ninox hirsuta*, *Temm.*, added by Holdsworth; this appears to be the *Athene scutulata*, *Raff.*, a hairy owl of Layard's list, *J. A. S. Beng.*, xiv. 186.
- † Ephialtes scops*, *Linn.* (a small ashy grey owl found in the mountains, not seen by Holdsworth).
sunia, *Hodg.*, small reddish eared owl.
lempijii, *Horsf.* Bakkamuna, *Horsf.*
Ketupa Ceylonensis, *Gm*.
†Huhua pectoralis, *Jerd*.
Syrnium intranscens, *Gray*.
Strix Javanica, *Gm*. *Indica*, *Blyth*.
Batrachostomus moniliger, *Layard*, the Ceylon frog mouth.
- †Caprimulgus atripennis*, *Jerd*.
Kelaartii, *Blyth*.
Asiaticus, *Lath*.
Cypselus batassiensis, *Gray*.
melba, *Linn.*, a large white-bellied swift, found in the mountains.
affinis, *Gray*.
Dendrochelidon coronatus, *Tickel*.
 (Macropyx coronatus of Layard's list, a migratory crested swift.)
Collocalia nidifica, *Gray*.
†Acanthylis caudicuta, *Lath*.
Hirundo erythropygia, *Sykes*. (*H. daurica* of Layard.)
rustica, *Linn*.
hyperythra, *Layard*.
- Hirundo domicola*, *Jerd*.
†panayana, *Gm*.
Coracias Indica, *Linn.* (The Indian roller, found in the north.)
Harpactes fasciatus, *Gm*. The faciated trogon, a crimson-breasted bird, found on high trees in the south.
Eurystomus orientalis, the oriental roller, a rare bird with green and azure plumage.
Pelargopsis gurial, *Pears*. (*Halcyon capensis* of Layard's list.)
Halcyon smyrnensis, *Linn*.
pileata, *Bodd*. the black-capped kingfisher, *H. atricapillus*, *Gm.*,
 • of Layard, a rare bird only found at Jaffna.
Ceyx tridactyla, *Pall*.
Alcedo Bengalensis, *Gm*.
Ceryle rudis, *Linn*.
† Hydrocissa coronata, *Bodd.*, added by Holdsworth, *P. Z. S.*, 1872.
Merops Philippinus, *Linn.*, blue-tailed, the largest of the bee-eaters.
viridis, *Linn*.
quinticolor, *Keill*.
Upupa nigripennis, *Gm*.
Nectarinia Zeylanica, *Linn*.
minima, *Sykes*.
Asiatica, *Lath*.
lotenia, *Linn*. (purple and brown, long-billed, very numerous).
Phyllornis Malabarensis, *Lath*.
†aurifrons, *Temm.* (only in Dr. Kelaart's list).
Jerdonii, *Blyth*.
Dendrophila frontalis, *Horsf*.
Piprisoma agile, *Blyth*, a rare bird, bill and legs dun, olive and brown plumage. *J. A. S. Beng.*, xiii. 395.
Dicaeum minimum, *Tick*.
† Prionochilus vincens*. *P. Z. S.*, 1872, p. 729.
Orthotomus longicauda, *Gm*.
Cisticola schœnicola, *Bonap*.

**Drymoipus valida*, *Blyth*. (*Drymoica valida* of Layard.)

†*Jerdonii*, *Blyth*, added by Holdsworth.

inornata, *Sykes*, common in marshes, making nests among reeds.

**Prinia socialis*, *Blyth*, found in paddy fields about Jaffna; a variety is described by Mr. Legge, *P. Z. S.*, 1870, p. 673.

Acrocephalus dumetorum, *Blyth*. (*Phyllopnusto montanus* of Layard, a greenish mountain bird from Nepal.

Phylloscopus nitidus, *Lath.* *Phyllopnusto nitidus*, *Blyth*, of Layard.

‡*viridanus*, *Blyth*, in Layard's list only.

Copsychus saularis, *Linn.*

Kittacincula macroura, *Gm.*

† *Copsychus Ceylonicus*, *Sclater*.

Pratincola caprata, *Linn.*, the red-hill robin.

atrata, *Kela.*

Larvivora Cyanea, *Hodg.* (*Calliope cyanea* of Layard, a blue woodchat, migrates from Nepal.

Thamnobia fucata, *Linn.*

Cyanocula suecica, *Linn.*, a blue-necked warbler.

‡*Sylvia affinis*, *Blyth*.

Parus cinereus, *Vicill.*

Zosterops palpebrosus, *Temm.*

†*Ceylonensis*, *Holds.* *Z. annulosus* of Kelaart.

Iora Zeylanica, *Gm.*

typhia, *Linn.*

Motacilla sulphurea, *Becks.*; *Calobates sulphurea*, *Holds.*

Limoniidromus indicus, *Gm.* (*Motacilla indica*, Layard's list.)

‡ *Motacilla madraspatana*, *Briss.*, rare.

Budytes viridis, *Gm.*, green wagtail.

Corydalla Richardi, *Vicill.* (*Anthus Richardi* of Layard's list, a pipit.)

rufulus, *Vicill.* *A. rufulus* of Layard.

striolatus, *Blyth*.

* *Brachypteryx Palliseri*, *Blyth*, a deep olive.

**Alcippe nigrifrons*, *Blyth*.

Pitta brachyura, *Jerd.*

Oreocincla spiloptera, *Blyth*.

nilgirensis, *Blyth*. *Zoothera imbricata* of Tennent's list.

Turdulus Wardii, *Jerd.* (*Merula Wardii* of Layard.)

Kinnesii (*Merula Kinnesii*, *Kela.* of Layard).

*†*Arrenga Blighii*, a new bird added by Holdsworth, discovered in 1867. The head and shoulders are a deep blue and the rest black; found in high mountains among dense jungles. Allied to *A. cyanea*, *Horsf.*

Dumetia albobularis, *Blyth*.

Oriolus melanocephalus, *Linn.*

‡*Indicus*, *Sykes*.

**Garrulax cinereifrons*, *Blyth*.

**Pomatorhinus melanurus*, *Blyth*.

Malacocercus striatus, *Swain.* Holdsworth says the true *M. griseus* is not found in Ceylon as entered in Layard's list.

**Layardia rufescens*, *Blyth*. A new genus, *M. rufescens* of Layard, *J. A. S. B.*, xvi. 453, Holdsworth.

**Drymocapthus fuscocapillum*, *Blyth*. (*Pillomeum fuscocapillum* of Layard.)

Pyctorhis Sinense, *Gm.* (*Chrysomma Sinense* of Layard, a white-bellied babbler.)

Criniger ictericus, *Strick.*, olive green.

Kelaartia penicillatus, *Blyth*. A new genus *P. penicillatus* of Kelaart.

Ixos luteolus, *Less.* *P. flavirictus*, *Strick.* of Layard.

Pycnonotus hamorrhoids, *Gm.*

Hypsipetes ganessa, *Sykes*. *H. Nilgheriensis* of Layard, the black Nilgherry bulbul.

†*Rubigula aberans*, *Blyth*. Jerdon adds this bird to the avifauna of Ceylon, ed. 1862.

†*melanictera*, *Gm.* Holdsworth says this bird is peculiar to Ceylon and not uncommon in the lower country; it is an olive brown on the back and yellow underneath. This seems to be *R. gularis*, *Blyth*.

Pycnonotus nigricapillus, *Drap.*
atricapillus, *Vieill.*

Hemipus picatus, *Horsf.* These three are omitted by Holdsworth.

Cyornis rubiculoïdes, *Vigors*.

†*Jerdonii*, *Gray*. *C. banyumas*.
Horsf., added by Holdsworth.

*†*Glancomyias sordida*, *Lord Walden*.

*†*Geocichla Layardii*, *idem*.

Myiagra cœrula, *Bodd.*

Myiastes cinereocapilla, *Vieill.*
Cryptolopha cinereocapilla,
Blyth, of Layard.

Leucocerca compressirostris, *Blyth*,
narrow-billed flycatcher, a var.
of *L. aureola*, *Less.*

Tchitrea paradisi, *Linn.*

†*Butalis latirostris*, *Raff.* *muttui*,
Layard. *Alseonax ferrugineus*,
Jerd.

Pericrocotus perigrinus, *Linn.*
flammeus, *Forst.*

†*Ochromela nigrorufa*, *Jerd.*

Erythrosterina leucura, *Gm.* *E. hyperythra* of Holdsworth.

Campephaga Macei, *Linn.*

Sykesii, *Strick.* These two are
omitted in Holdsworth's list
Qy. his *Graucalus pusillus*, *Bly.*

Artamus fuscus, *Vieill.*

**Dicrurus edoliformis*, *Blyth*. *Disse-*
murus lophorhinus, *Vieill.* of
Holdsworth.
longicaudatus, *Hay.*

* *Dicrurus leucopygialis*, *Blyth.*

‡*cœrulescens*, *Linn.*

minor, *Blyth.* *D. macrocerus*,
Vieill. of Layard. Mr. Holdsworth
says this large Indian species
was mistaken for *D. minor*,
one of the Drongo shrikes.

Edolius paradiscus, *Gm.* *Dissemurus*
malabaricus, *Scop.* of Holdsworth,
the long-tailed bringa of
Nepaul.

Irena puella, *Lath.*

Lanius cristatus, *Linn.* *L. superciliosus*
of Layard mistaken for it.
erythronotus, *Vigors*, rufous-backed
shrike.

Tephrodornis affinis, *Bly.*

*†*Hemipus picatus*, *Sykes*, added by
Holdsworth.

†*Volvocivora Sykesii*, *Strick.*, added by
Holdsworth.

†*Graucalus Layardi*, *Blyth.*

**Cissa ornata*, *Wagler*. *C. puella*,
Blyth of Layard, *Holdsw.*

Corvus splendens, *Vieill.*

culminatus, *Sykes.*

Eulabes religiosa, *Linn.*

**ptilogenys*, *Blyth*, *J. A. S. Beng.*,
xv. 31.

Pastor roseus, *Linn.*

Heterornis pagodorum, *Gm.* The
pagoda starling *Temenuchus* of
Holdsworth.

Temenuchus senex, *Temm.* *H. albi-*
frontata of Layard.

Acridotheres tristis, *Linn.*

Ploceus baya, *Blyth*, said to be mi-
gratory.

striatus, *Blyth*, an Indian weaver-
bird. *P. manyar* of Layard.

Munia undulata, *Lath.*, a reddish
spotted finch.

Malabarica, *Linn.*, brown ditto.

rubronigra, *Hodgs.*

Malacca, *Linn.*, a black-headed
grobeak.

striata, *Linn.*

Kelaartii, *Blyth*, a deep brown
finch, almost identical with Jer-
don's *M. pectoralis*.

†*Estrela amandava*, *Linn.*

Passer Indicus, *Jerd.*

Alauda gulgula, *Frank.*

Malabarica, *Scop.*

Pyrrhulauda grisea, *Scop.*

Myrastra affinis, *Jerd.*, the Maaras bush-lark, common at Aripo.

Buceros gingalensis, *Shaw.* *Tocus gingalensis* of *Holdsw.*

Malabaricus, *Jerd.*, also called *B. pica*.

**Loriculus Asiaticus*, *Lath.* *Indicus*, *Gm.*

Palæornis Alexandri, *Linn.*

torquatus, *Briss.*

cycanocephalus, *Linn.*, omitted by *Holdsworth*.

Calthropæ, *Layard.*

†*rosa*, *Bodd.*, added by *Holdsworth*.

Megalaima Indica, *Latr.* (*Xantholaima Indica* of *Holdsworth*).

Megalaima Zeylanica, *Gm.*

**flavifrons*, *Cuv.*, the yellow fronted barbet.

**rubicapilla*, *Gm.*

Picus gymnophthalmus, *Blyth.* *Yungipicus gymnophthalmus* of *Holdsworth's* list.

‡*Maharattensis*, *Lath.*, a yellow fronted woodpecker, back and wings black.

Gecinæ chlorophanes, *Vieill.* *Chrysophlegma chlorophanes* of *Holdsworth*.

Brachypternus aurantius, *Linn.*

Ceylonicus, *Forst.*

**Stricklandii*, *Layard.*

†*puncticollis*, *Meth.* *Holdsworth* adds this bird to the Ceylon avifauna, golden-backed with white dots on the neck.

Micropternus gularis, *Jerd.*, an olive green, ground woodpecker.

†*Chrysocolaptes festivus*, *Bodd.*, in Lord Walden's collection, black back and golden wings.

Centropus rufipennis, *Illiger.*

**chlororhynchus*, *Blyth.*

Coccyzus jacobinus,^o *Bodd.* *Oxylophus melanoleucos*, *Gm.*, of *Layard's* list, the pied-crested cockoo.

‡*Coromandus*, *Linn.*, *Oxylophus Coromandus* of *Layard*, reddish wings.

Eudynamys orientalis, *Linn.*

‡*Cuculus poliocephalus*, *Lath.*, an ashy-headed small species, micropterus, *Gould*, of *Kelaart*.

canorus, *Linn.*

‡*striatus* *Drapiez*, omitted by *Holdsworth*. *Qy.* his *P. Sonneratii*.

Polyphasia tenuirostris, *Gray.*

‡*Sonneratii*, *Lath.*, a banded bay.

‡*Cuculus xanthorhynchus*, *Horsf.*

‡*Hierococcyx varius*, *Vahl.*, bill green, iris yellow, feet yellow.

Surniculus dieruroides, *Hodgs.*, fork-tailed, bill and feet black, iris hazel.

**Phænicophæus pyrrhocephalus*, *Forst.*, iris brown, feet leaden.

Zanclostomus viridirostris, *Jerd.*, a green-billed malkoha, common in the south; this seems to be only a variety of the above, iris red, feet dark leaden.

†*Taccocua Leschenaultii*, *Less.*, added by *Holdsworth*, bill red, tip yellow, irides reddish.

Osmotreron bicincta, *Jerd.* *Treron bicincta* of *Layard's* list.

flavogularis, *Blyth.*

**Pompadoura*, *Gm.*

Crocopus chlorogaster, *Blyth*, *Treron chlorogaster* of *Layard*.

**Carpophaga Torringtonia*, *Kela.* *Palumbus Torringtonia* of *Holdsworth*.

sylvatica, *Tick.* *C. pusilla*, *Blyth*, of *Layard*.

Alsocomus punicus, *Tickel.*

Columba intermedia, *Strick.*, the Indian rock-pigeon.

Turtur risorius, *Linn.*

Suratensis, *Lath.*, a speckled turtle-dove.

- †*Turtur humilis*, *Temm.* rose-coloured dove of Layard, omitted by Holdsworth.
rupicola, *Pall.*, erroneously entered as *Turtur orientalis*, *Lath.* in Layard's list.
Chalcophaps Indicus, *Linn.*
Pavo cristatus, *Linn.*
 **Gallus Lafayetti*, *Less.*
 **Galloperdix bicalcaratus*, *Linn.*
 • *Francolinus Ponticerianus*, *Gm.*, ortygornis Ponticerianus of Holdsworth.
Perdica Asiatica, *Lath.*
Coturnix Chinensis, *Linn.* *Excalfactoria Chinensis* of Holdsworth.
Turnix taigoo, *Sykes.*, var., the Indian hill quail.
Esacus recurvirostris, *Cuv.*, the curved bill sandpiper.
Oedipodus crepitans, *Tem.*, the thick-kneed plover.
Cursorius Coromandelicus, *Gm.*, the Coromandel courser.
Lobivanellus bilobus, *Gm.*, *Sarciphoorus bilobus* of Holdsworth.
Goensis, *Gm.*
Charadrius fulvus, *Gm.* *C. longipes*, *Temm.*, apud *Jerd.*, an ash-coloured plover. Layard's *C. virginicus*, *Becks.*
Hiaticula philippensis, *Scop.*, small sand plover. *Egalitis dubius* of Holdsworth.
 †*cantianus*, *Lath.*, very similar to the next.
Egalitis Mongolicus, *Pall.*, *Hiaticula Leschenaultii*, *Less.*, of Layard mistaken for it, migrates to isle in N.E. monsoon, bill black, irides dark brown, legs grey.
Streptopelia interpres, *Linn.*
 †*Chettusia gregaria*, *Pall.*, a single specimen was shot on the Galleface Colombo by Holdsworth.
Ardea purpurea, *Linn.*
cinerea, *Linn.*
intermedia, *Wagl.* *Herodias egret-*
toides of Holdsworth, the ash egret.
Ardea Asha, *Sykes.*
garzetta, *Linn.*
alba, *Linn.*
 • *bubulcus*, *Savig.* *Buphus Coromandelus*, *Bodd.* of Holdsworth.
Ardeola leucoptera, *Bodd.*
Ardetta cinnamomea, *Gm.*
flavicollis, *Lath.*, yellow-necked heron or black bittern.
Sinensis, *Gm.*
Butoroides Javanica, *Horsf.*
Platalea leucorodia, *Linn.*
Nycticorax griseus, *Linn.*
Tigrisoma melanolopha, *Raff.* *Goisachus melanolopha* of Holdsworth's list.
Mycteria Australis, *Shaw.*
Leptoptilus Javanica, *Temm.*
Ciconia leucocephala, *Gm.* *C. episcopus*, *Bodd.*
Anastomus oscitans, *Bodd.*
Tantalus leucocephalus, *Forst.*
Geronticus melanocephalus, *Lath.*
Threskiornis melanocephalus of Holdsworth.
Falcinellus igneus, *Gm.* The glossy ibis or black curlew.
Numenius lineatus, *Cuv.* *N. arquatus*, *Linn.* of Layard mistaken for it. The common curlew.
phaeopus, *Linn.*, the brown whimbrel.
Totanus fuscus, *Linn.*, the long red-shanked spotted whimbrel.
calidris, *Linn.*, a red-shanked snipe.
glottoides, *Linn.*, the Indian green shank.
Totanus stagnalis, *Becks.*, the little green shank.
Actitis glareola, *Gm.*, the swallowtail pratincole.
ochropus, *Linn.*, a green sandpiper.
hypoleucos, *Linn.*, the common sandpiper.
Tringa minuta, *Liest.*, a dwarf sandpiper or little stint; it seems to

- differ from the Indian little stint,
T. subminuta, *Jerd.*, p. 875.
- Tringa subarquata*, *Gm.*, the curlew
 stint.
- ††*salina*, ●*Pall.*, found by Hold-
 worth at Aripo, 1870.
- platyrhyncha*, *Temm.*, *Limicola*
 of Layard.
- †*Limosa egocephala*, *Linn.*, mentioned
 by Layard, the black-tailed
 godwit.
- †*Terekia cinerea*, *Gm.*, found in a swamp
 near Aripo, 1869, by Hold-
 worth.
- Himantopus autumnalis*, *Hass.*, the
 long-legged plover.
- Recurvirostra avocetta*, *Linn.* The
 curved-billed *avocetta* arrives
 in N.E. monsoon.
- Hamatopus ostralegus*, *Linn.*, the
 oyster-catcher.
- Rhynchæa Bengalensis*, *Linn.*, painted
 snipe.
- Scolopax rusticola*, *Linn.*
- Gallinago stenura*, *Temm.*
- †*scolopacina*, *Bonap.*, the common
 English snipe.
- †*gallinula*, *Linn.*, the jack snipe.
- Hydrophasianus Sinensis*, *Gm.*
- Rallus striatus*, *Linn.*, the striped
 rail.
- Indicus*, *Blyth*, the Indian water-
 rail.
- Porphyrio poliocephalus*, *Lath.*, the
 purple coot.
- †*Porzana pygmaea*, *Nan.*, the pigmy rail.
- †*fusca*, *Linn.*, brown land rail; this
 seems to be the same as *Ortygo-*
metra rubiginosa, *Temm.* of La-
 yard.
- Zeylanica*, *Gm.*, also named *Ral-*
lina Ceylonica, *Corethura Zey-*
lanica of Tennent's list.
- Gallinula phœnicura*, *Forst.*
chloropus, *Linn.*, the common
 water-hen, *gallicrex* of Hold-
 worth.
- cristata*, *Lath.*, crested water-hen.
- Phœnicopterus ruber*, *Linn.*
- Sarkidiornis melanonotus*, *Penn.*, the
 royal duck.
- Nettapus Coromandelianus*, *Gm.*, Co-
 romandel teal, *Anserella Coro-*
mand. of Holdsworth.
- Anas pæcilorphyncha*, *Penn.*, spotted
 duck.
- Dendrocygnus arcuatus*, *Cuv.*, whist-
 ling duck.
- Dafila acuta*, *Linn.*, pin-tailed duck. ● ●
- Mareca Penelope*, *Linn.*, the widgeon.
- Querquedula crecca*, *Linn.*, the com-
 mon teal.
- circia*, *Linn.*
- Fuligula rufina*, *Linn.*, red-crested
 pochard.
- Spatula clypeata*, *Linn.*, the shoveller
 duck.
- Podiceps Philippensis*, *Gm.*
- Xema brunnicapillus*, *Jerd.*, *Laurus*—
 of Layard.
- Sylochelidon Caspius*, *Lath.*, the Cas-
 pian tern.
- Croicocephalus ichthyæetus*, *Pall.*,
Laurus ichthyæetus of Layard.
- Hydrochelidon Indicus*, *Steph.*, *H.*
leucopareia, *Matt.*, of Hold-
 worth.
- Gelochelidon Anglicus*, *Mont.*
- †*Onychoprion anæstætus*, *Scop.*, a
 kind of tern.
- †*Sterna Javanica*, *Horsf.*, common on
 tanks, as seen by Layard, omit-
 ted by Holdsworth.
- melanogaster*, *Temm.*, black-
 breasted tern.
- Sinensis*, *Gm.*, *S. minuta* of La-
 yard mistaken for it.
- ††*gracilis*, *Gould*, one shot by
 Holdsworth at Colombo, 1869.
- †*nigra*, *Linn.*, added by Hold-
 worth, a tern new to the Indian
 avifauna.
- Scena aurantia*, *Gray.*
- Thalasseus Bengalensis*, *Less.*, *T. me-*
dius, *Horsf.* of Holdsworth.
- cristata*, *Steph.*, a tern.
- †*Dromus ardeola*, *Payk.*, a sea tern.

- | | |
|---|---|
| <p><i>Atagen ariel</i>, <i>Gould</i>, <i>A. aquila</i>, <i>Linn.</i>
 †<i>Phaeton rubicauda</i>, <i>Bodd.</i>, the red-tailed tropic bird, occasionally seen off the coast.
 †<i>Sula fiber</i>, <i>Linn.</i>, the booby of mariners, added by Holdsworth.
 <i>Plotus melanogaster</i>, <i>Gm.</i>, <i>Thalassidroma</i> of Layard.</p> | <p><i>Pelicanus orientalis</i>, <i>Linn.</i>
 <i>Graculus sinensis</i>, <i>Shaw.</i>
 <i>pygmæus</i>, <i>Pall.</i> This seems to be <i>G. javanicus</i>, <i>Horaf.</i>, of Holdsworth.
 <i>Thalassidroma pelagica</i>, the stormy petrel, seen at sea off Galle and Colombo in bad weather.</p> |
|---|---|

CHAPTER XXVI.

REPTILES.

EMYDOSAURI.—*Crocodiles*, erroneously called alligators by the Europeans, swarm in the rivers, lakes, marshes, and lagoons of the lower country, but are not found in the higher parts. The crocodile is a lazy animal, naturally fond of hot mud, and most at home in a steaming pestiferous swamp or sedgy bank of a river among mangrove trees, where he lies basking in the sun, and may be called the scavenger of the tropical river, delighting in the putrid carcasses of animals that float down the stream and are thrown on the slimy delta, being useful in eating what might otherwise create a pestilence. Although he prefers putrid flesh, he has no objection to a live animal, lying in wait in deep pools under a river bank for deer or other animals who come to drink, and occasionally devours a native incautiously bathing, or whom he can surprise in any way; he will also eat tortoises; and bricks and stones have been found in their stomachs.

Le Brun¹ relates a story of a crocodile taken by the Dutch that had devoured at different times thirty-two people. Although so large and voracious, the crocodile is essentially a coward and easily frightened, especially on shore, usually running at the approach of man to the water, where he is alone formidable or dangerous, any person or animal falling into the water in their vicinity being pounced upon at once. They often crawl along the sedgy bottoms of shallow rivers, occasionally rising to the surface and float about, with only the head partly above water, looking at a distance like a piece of wood with a rough bark. Towards the end of the monsoon,

¹ Le Brun's Travels, ii. 82.

when the haunts of those who frequent the tanks and marshes dry up, some bury themselves in the mud until the rains soften the earth, and release them from their imprisonment; others wander about into jungles and even approach habitations in search of water, the pangs of thirst overcoming their natural timidity. Many get to the larger rivers, where they remain until the rain enables them to return to their old haunts. Knox, no bad authority, says, "the alligators leave the ponds when they dry up for rivers and woods, and return again during the rains."

Dr. Kelaart says there are two species of crocodiles in Ceylon, one frequenting the tanks and marshes (*C. palustris*), the mugga or Goa marsh crocodile, and the other found in the mouths of rivers and lagoons. There is not much difference in their appearance, only the marsh species is smaller, being about thirteen feet long and a paler colour; it is also comparatively harmless. The river crocodile, "Allie Kimbola" of the natives, is a formidable animal, attaining a length of seventeen or eighteen feet. They are web-footed, with four toes, and the tail is flattened like an oar. Their teeth fit into each other, something like those of a rat-trap, and the eyes are close together and parallel when closed. Crocodiles are said to lay from eighty to one hundred and fifty eggs, which are deposited at the edges of rivers or tanks, and either buried in the sand or piled up in a heap and covered with mud, where they are hatched by the heat of the sun, and are about the size of a goose egg, with an earthy brittle shell and a very thick and tough interior membrane, resembling in this respect those of lizards and turtles. It does not appear to have been explained, to which of the Indian species the river crocodile of Ceylon belongs, but it has no resemblance to the gavial of the Ganges, a variety differing from all others.

They afford little amusement to a sportsman, and the places they infest are full of malaria. Sir S. Baker says, "their skins are not so impervious to a ball as is supposed, and that a shot between the eyes will finish them."¹ But the weapons he used shoot harder than the old guns, which made very little

¹ "Rifle and Hound," p. 47.

impression on them; being so tenacious of life they are said to have crawled away after having been disembowelled and left for dead. Sir Robert Horton, when Governor of Ceylon, tried in 1833 to catch some in a tank at Aripo, with a strong drag-net heavily loaded at the bottom, but when the net was drawn across it was found empty, the crocodiles had escaped by sinking into the mud.

Fishing for crocodiles is sometimes practised as an amusement, "the hook is baited with a piece of flesh and attached to a hank of fine cords, which getting between their teeth they cannot gnaw it asunder, as they would a single rope. This is a very ingenious device of the Sinhalese, and answers admirably; when hooked they make a tremendous resistance while in the water, keeping their head above it, having no fleshy lips all their teeth are seen, and they knock their hideous jaws together with a loud clashing noise; when hauled on shore they feign death and lay motionless, the picture of abject cowardice, being finally despatched with a spear."¹ Herodotus describes fishing for crocodiles in the Nile with a hook baited with pork; and Pallegoix² says they are eaten in Siam, but the Siamese are, if possible, more omnivorous than the Chinese.

SAURA. *Monitors*.—There are two varieties of a very large amphibious lizard, called "monitors," from an erroneous idea that they gave warning of the vicinity of crocodiles.

The *Monitor dracæna*, or common iguana, or "goana" of the natives, is very abundant in the maritime provinces, living in holes in the earth, eating small reptiles and white ants, a harmless but very repulsive-looking creature, about five feet long, of a silvery-grey colour. At Trincomalee and Calpentin they are hunted with dogs by the natives, who eat them, being sold for sixpence each, and are said to "make a soup resembling hare."³ The iguana is also eaten in the West Indies, where it is considered to be like rabbit. Nicolo di Conti mentions their being hunted for food in India, as their flesh was highly prized, which explains a strange statement of

¹ Tennent, Nat. Hist.

² Trav. in Siam.

³ Kelaart, Fau. Zey. p. 147.

Friar Odoric, who says, "There are mice as big as our country dogs, and therefore they are hunted with dogs because cats are not able to encounter them."

The streaked-face lizard (*Hydrosaurus salvator*),¹ kabara-godho of the Sinhalese, is a much larger species, attaining a length of six feet, found in the interior near marshes and muddy places, taking to the water when pursued; they have a dark band along the side of the neck reaching to the eye, transverse yellow bands on the body with numerous yellow spots between them, long head, tail and toes, and are covered with eruptive blotches. An allied species similarly affected, found in the Nepal, has been named *M. exanthematicus*. On the homœopathic principle the Sinhalese believe that the fat of the godho applied externally is a remedy for skin diseases, but if taken internally a poison, forming one of the ingredients of the "Kabara tel," but it is evident, from the strange recipe for making this poison given by Sir E. Tennent, that the arsenic it contains is the real poisoning ingredient, and the fat of the lizard only a device to conceal its use. A small lizard, called "adda" by the Arabs (*Sinicus officinalis*), is much praised in Egypt as a cure for leprosy and elephantiasis. An old-fashioned Venetian remedy for diarrhœa and dysentery is said to have been made from vipers' livers, and the sand-burrowing lizards of Afghanistan when dried are sold all over India as a medicine.²

Sir E. Tennent³ says the *H. salvator* is not found in any part of the peninsula, or further west than Burmah, and is one of the proofs of the affinity between the fauna of Ceylon and the Archipelago. Dr. Gray, in his work on Lizards, ed. 1845, says, "there is one in the British Museum which came from South Africa;" however this may be, it is certainly, according to Mr. Blyth, a native of the Nicobars and lower Bengal, where some have been found seventy-eight inches long, but does not belong to the peninsula.⁴ Dr. Cantor also, in his catalogue of Malay reptiles, makes it a native of Bengal; he

¹ Monitor elegans, Gray.

² Nat. Hist. Ceylon, p. 275.

³ J. A. S. Beng., 1860, p. 37.

⁴ J. A. S. Beng., xxix. 108.

says the lower caste Hindus, who are very fond of their flesh, dig them out of the river banks.¹ It is said a young one was discovered on board a vessel bound from Bombay to Calcutta.

Scincidæ, or *Scincs*,² are a family of snake-like burrowing lizards, distinguished by long bodies and tails, with short legs and a metallic appearance of skin. The most remarkable is the Brahmin lizard (*Tiliqua rufescens*) of a deep brown-olive colour with a pale streak on the side, a common and wide-spread species, presenting several varieties. *Mabouya elegans*, Gray, is a white streaked scinc with a transparent eye-lid.

There have been recently discovered in the island several allied genera, some of which are peculiar to it, while others, as the *Acontias*, are of the South African type. Some of these strange reptiles resemble the blind-worms or orvet of Europe, *Anguis fragilis*, and are also allied to *Cylindrophis* and *Rhinophis*, or burrowing snakes, being less of the lizard and more of the snake than other scincs, having round bodies with very diminutive limbs, or only a trace of them, and what are called rostral shields, or a horny covering to their pointed noses, which enables them to force their way into the earth; they are usually of a dark brown colour and a few inches in length.

Eumeces Taprobanes is a scaly variety, five inches long, a brown colour above and yellow below. The genus named *Nessia*, peculiar to Ceylon, have four very feeble limbs, and *Acontias Layardii*, an olive colour with spots, has only a trace of limbs.

Geckoes.—One of the first things that attracts the eye of a new arrival in the island is the number of small lizards called geckoes, running over the ceilings in the evenings, catching flies, and a novice expects every moment to see one drop into some of the dishes on the dinner-table; occasionally one does fall on the ground, when part of their tail comes off, remaining wriggling on the floor, while its possessor makes his escape with all imaginable speed, apparently none the worse for the dismemberment, a new tail growing in place of the lost one in a few weeks.

¹ J. A. S. Beng., 1846, 1847, 376, p. 636.

² Also spelt "skinks."

This remarkable peculiarity of the gecko family, who drop their tails when they fall, or are hotly pursued, was noticed by Pliny (ix. 46). The part that comes off appears to grow separate from the stump, and the reproduced tail, which is rounder and thicker than the previous one, has no bones. Another peculiarity in geckoes is their having a thick tongue and a voice making a chirping noise, a repetition of the word "cheecha," the native name for the house gecko (*Hemidactylus frenatus*), and will respond to an imitation of it, made by a person to whom they are familiar; the noise they make is considered by the Hindus of evil omen, "a judge once frightened a Hindu into telling the truth by saying a gecko would answer him when he chirped."¹

They are perfectly harmless, and easily tamed and taught to come and be fed with rice, and will drink water, lapping it up with their tongues. Their eggs are found in holes, and under stones about houses; a slight tap with a stick will break the shell, and if nearly hatched from the heat of the sun, out comes a young one, which runs off with the greatest rapidity, although, perhaps, ushered into the world a little sooner than usual. There are many varieties in the island, some frequenting trees, others roofs of houses, and some ant-hills; the majority are nocturnal, having the pupil of the eye contracted in a vertical direction like a cat, and have a flat disk or sucker on their feet, which enables them to hold on to an inverted surface. The different species vary from four to seven inches in length, and have a soft fleshy skin of a warm grey or chocolate colour, with dark spots or streaks, and cast their skins like snakes. A species (*Ptychozoon*) found in India flies. The tree gecko (*Peripia Peronii*) varies its colour, sometimes having a black hue about the head, and will live for months without food in the hollows of trees, where they lay from five to six eggs. They are common in the north; also in the Isle of France.

Gymnodactylus Kandianus is a spiny-backed diurnal species, with free claws, peculiar to Ceylon, found in the mountains; also *Geckoella punctata*, a new and distinct genus, of a choco-

¹ Kelaart, p. 162.

late-brown colour, spotted with white, having five clawed toes and no disks.¹

Agamidæ.—Eight families of true lizards are found in Ceylon, of which four are peculiar to it—*Lyriocephalus*, *Ceratophora*, *Cophotis*, and *Otocryptis*. Many of them are subject to changes of colour, occasionally varying their ordinary hues. The most common of all is one of the *Calotes* (*C. versicolor*), called the “blood-sucker” by the Europeans, a very ill-favoured, greenish lizard, about twelve inches long, having fin-like spines behind the head and shoulders. They are constantly fighting, throwing each other out of the trees, when their heads and necks swell out and turn blood-red, their bodies at the same time assuming a pale tint, which appears to be caused by the blood rushing towards the head. Nearly all the *calotes* have two rows of spines about the head and shoulders. Most of them have large pouches, or gular sacks, hanging under their jaws, and live in holes of trees, where they deposit their eggs, preying on flies, beetles, and other insects.

C. Liocephalus is a variety peculiar to Ceylon recently discovered, of a green colour, with dark cross bands, no spines, and a small gular sack.²

Salea Jerdonii is a rare genus, of a bright green colour, only one species being known, also found in Southern India.

Sitana are a species of lizard easily recognised from having only four toes on their hind legs, and of a reddish-brown, which changes to deeper hues or pale yellow. The gular sack is tri-coloured at particular seasons. They are chiefly found in the north of the island. Only two species of *Sitana* are known, and are peculiar to Ceylon and Western or Southern India. Dr. Gunther doubts if the *S. pondiceriana* of Cuvier be found in Ceylon, as stated by Dr. Kelaart, but a variety, *S. minor*, similar to Jerdon’s *S. ponticeriana* of Southern India.

The lyre-headed lizard (*Lyriocephalus scutatus*) is a very repulsive but harmless reptile, something like a chameleon, of a bluish-grey, greenish about the head. The inside of the mouth is a bright red. They are about fourteen inches long, and found in the interior, and are said to live on rice in captivity.

¹ P. Z. S., 1867, Ann. Nat. Hist., 1872.

² Ann. Nat. Hist., 1872, p. 86.

In Gray's "Illustrations of Indian Zoology" (1831), there is a drawing of an extraordinary lizard, brought from Ceylon many years since by Colonel Stoddart, which belongs to a family of horned and snouted lizards called *Ceratophora*, allied to *Lyriocephalus*. Since then some more varieties of them have been discovered in the interior of the island. They have a bluish or green hue, marked with dark bands, and change to a darker colour when alarmed. One variety, *C. Stoddartii*, which is ten inches long, has a small pointed horn on the end of the nose, resembling that of a rhinoceros, but its construction is different, being a soft substance covered with a horny sheath, and is a smaller size in the female. In another variety, *C. Tennentii*, the nose is turned up, and prolonged into a flattened snout. A variety recently discovered, *C. aspera*, is a very small species, only three inches long, half of which is tail, and the horn exceedingly diminutive. The body is a brown colour, with spots.¹

Otocryptis bivittata, an arboreal lizard, found about Trincomalee, Adam's Peak, and Ratnapura, has a peculiar gular sack, something like a dewlap, running under the neck and breast. They are an olive colour, with a white band on each side of the back, and about ten inches long. There was one some years since in the museum at Berlin, but it was not known where it came from.²

A new genus, or eared lizard, *Cophotis Ceylanica*, has recently been added to the fauna of Ceylon. They are six inches long, and covered with imbricated scales, and have a comb of spikes along the back. The head is pyramidal, with a concealed tympanum, and a brown colour, while the body is fawn, with irregular brown bands; a yellow band runs along the upper lip to the shoulder.³

The Ceylon chameleon (*C. Zeylanicus*), which Jerdon thinks quite distinct from the African (*C. vulgaris*), is almost confined to the north of the island, and is not numerous. This reptile has a dull and torpid nature, and in its habits resembles the sloth, remaining for hours in the same position, moving

¹ Gunther, Reptiles, Brit. Ind.

² Gray, Lizards, 1845.

³ Ann. Nat. Hist., 1862, p. 419.

almost imperceptibly and stealthily among trees, where it spends most of its time, firmly grasping the trunk with its toes, and holds on much by the end of the tail, which it coils round the smaller branches. It can, however, dart out its tongue at the insects on which it lives with the velocity of lightning. This extraordinary member is covered with a slimy substance, to which the insects adhere when it touches them. It was supposed by the ancients¹ that the chameleon lived on the air, in consequence of the length of time it can remain without food, and its peculiar formation has given rise to much speculation. The skin is very granular and scaly, and the "rete mucosum," or colouring layer, contains two kinds of pigments in deep cavities, and is movable, which is supposed to cause the changes of hue that have so long attracted attention to this creature. At times it is a living skeleton, and the skin hangs in folds on the frame, giving place to sudden inflations. The lungs, as in most lizards, are connected with air cells under the skin, which hangs loose on the bones; according as these cells are filled with air the reptile appears thin or bloated. They are said to place their eggs in the ground. Not the least extraordinary part of the chameleon is the eye.

OPHIDIA.—*Snakes*.—Nearly fifty different species of snakes have been discovered in Ceylon. About eight frequent trees, two are fresh water species, and seven or eight sea snakes. The majority are quite harmless. Those alone are poisonous who possess perforated fangs, which convey a poisonous fluid, secreted in a gland in the head, into the wound. Even the possession of fangs does not always prove a snake to be poisonous, there being a few exceptions to the rule.

Non-venomous snakes have two rows of small teeth in the upper jaw, with a lesser number in the lower. In venomous snakes the outer row of the upper jaw is represented by a single fang on each side, with one or two smaller ones to replace the others if they are lost. These reserve teeth lie loose. There are also a few small teeth in the front part of the lower jaw. From this it will be seen that the poison fangs can grow

¹ Plin., Nat. Hist., viii. 51. Aristotle H. A., l.ii. cxi.

again after being extracted, which was not generally supposed to be the case.

The fangs are solid bone, formed as it were of a narrow flat piece folded over until the edges nearly meet, thus leaving an open groove the whole length, through which the poison flows. The groove is more open above than below, where it is nearly closed. Viperine fangs are larger than colubrine.¹

Snakes are all carnivorous, eating small reptiles, and animals, birds, or eggs; commonly frogs or mice, and some devour their own species. They swallow their prey whole, having a remarkable and peculiar power of drawing in small animals, and slowly ingulphing them. The majority can abstain from food for months, and are supposed to be very long lived. Some ophidia are viviparous and others oviparous. Colubrine snakes are oviparous, except the *Hydrophis* and *Homalopsidæ*, which are viviparous, producing from four to sixteen young.

In oviparous snakes the young are in eggs with a soft shell, which are hatched in sand and other places. Viviparous snakes bring forth their young alive from eggs which are hatched in the oviduct, the eggs bursting before parturition. The young of both species are in full activity immediately after birth. In order that her eggs may be hatched, the female viperine basks in the sun some time before parturition to increase her temperature. Female snakes are usually larger than the males.

There are four poisonous snakes in Ceylon—the cobra (*Naja tripudians*), the tic-polonga (*Daboia Russellii*), the carawalla (*Trionocephalus hypnale*), and the green carawalla (*Trimeresurus trigonocephalus*). The two last are supposed not to be fatal to man. There is some doubt whether a fifth, the *Bungarus Ceylonicus*, should not be added. The sea snakes are also all venomous, but the fresh water species are harmless.

The fort of Colombo is generally free from these dangerous reptiles, but they are often found in houses of the suburbs, and are very numerous at Kandy and other places. It is a happy

¹ The above description of snakes' fangs is taken from Dr. Fayrer's elaborate work on the "Thanatophida of India." He differs from Dr. Davy, who describes snakes' fangs as being quite solid at the point, the longitudinal groove in the side ending a little above it, which is the case sometimes.

provision of nature that generally speaking venomous snakes are very unwilling to bite. Cobras domesticate themselves in the vicinity of houses and native huts, but their chief impulse being concealment they get out of the way as soon as possible, and only bite when trodden on or greatly irritated, and, being partly nocturnal in their habits, the majority of accidents from them occur in this way. It is probable they are able to discriminate and know the faces of persons they are continually seeing, and may possess a certain amount of affection for the jugglers who carry them about for exhibition, and that it is a knowledge of this in the cobra that makes the Indian snake men select them, and rely more on this feeling and daring than any of the devices that have been attributed to them as preventives, such as antidotes, or extracting the fangs and poison. They never bite the snake men unless provoked by some unaccustomed familiarity or rough treatment, and as there have been some cases in Ceylon where these men have died from the effects of their bites, it is a proof that the poison was not extracted.

Snake men frequently visit Ceylon from India, as the Sinhalese never engage in this business. They carry the snakes about on their heads, coiled up in round soft baskets with a cap-shaped lid, and draw the reptiles out of their holes by sitting on the ground before it playing a pipe. After a time the cobra comes forth and erects itself before the man. Nothing can exceed the nerve and audacity they display in seizing the snake. Their usual manner is to catch them by the tail with one hand when at full length, keeping them at arm's length, at the same time pressing the snake's head on the ground with a stick held in the other hand, they then place one foot on the cobra's body, and seize it round the neck with the hand which held the tail.

The Sinhalese have a great dread of a cobra, not only on account of its bite but from a superstitious feeling, originating in snake worship. They, as well as the Hindus, display an unwillingness to kill them outright, and if they wish to get rid of one, they place it alive in a bag and throw it into a river, thus giving it a chance of escape. Sir E. Tennent says, "They

have a legend that some cobras have a valuable gem in their stomachs, but those possessing them are rare, perhaps one in a thousand." This appears to be an ancient Indian tradition, although he has not noticed it. In Philostratus's *Life of Apollonius of Tyana*, there is an account of serpent catching in India, for the purpose of extracting valuable gems from them. Solinus¹ also says gems were cut out of snake's heads; and Friar Jordanus speaks of serpents with gems.

- Cobras, called "Nája" by the Sinhalese and Hindus, have very thick bodies, and are usually between four and five feet long. Some have been found six feet in length. There is only one species, but they vary much in colour and markings, which are formed of dark spots on a paler ground. Many have a pair of spectacles delineated on the back of the hood. Some are nearly black, and albinos have been occasionally found. In common with most snakes their sense of hearing is very acute, but their sight is defective, and they cast their skins frequently.

The cobra, when placed on the ground, is distinguished by a peculiar habit of raising upright one third of their bodies, and expanding their hoods, darting out their heads when irritated. They are fond of burrowing in ant-hills and holes about houses, frequenting the neighbourhood of dwellings to prey on young fowls and eggs. If one is killed near a house its companion is sure to be seen soon after, haunting the place in search of its mate.² They are sometimes found in baths, and swim well. Captain Stewart, when superintendent of the pearl fishery, mentions that a sailor found a cobra four feet long on the deck of the *Wellington*, a small man-of-war employed in guarding the fishery at Aripo. It was supposed the snake had swam off from the shore and climbed the cable of the vessel. On another occasion an iguana was found in the same place.³

Snake-bites and Antidotes.—The number of deaths from snake-bites in Ceylon, according to some returns given by Sir E. Tennent, is under twenty per annum, the majority of the

Solinus, xlii. 139.

² *Vide* Plin., viii. 23, 35.

³ *Mem. on the Fishery*, p. 93.

sufferers being women and children.¹ In India, where, however, the number of venomous species is four times as great, they are enormous. In 1869, 11,416 deaths were recorded from this cause; and in 1871 no less than 18,778 people appear to have lost their lives from various dangerous animals in the peninsula.²

A host of medicaments and antidotes have been devised for snake-bites, but the experiments of Dr. Fayrer show that none of them are to be relied on to counteract the deadly nature of the poison when it has been deeply planted in a wound, there being nothing better than an immediate and vigorous adoption of the old treatment by ligatures and cauterization³ if life is to be saved. "The limb bitten should be instantly isolated by a ligature of cords above the wound, and tightened to the utmost to prevent the poison being absorbed, as it passes into the system with the greatest rapidity. The wound should be punctured and cauterised with a caustic, such as carbolic acid, a red coal, or hot iron. The Hindus use live charcoal and gunpowder, the patient's system to be supported by alcoholic or etherial stimulants. The person bitten may try to suck the poison out of the wound himself, but it would be dangerous for another to do so. The ligatures may be removed in half-an-hour if no poison symptoms appear."

An army doctor in Colombo was bitten in the thumb by a cobra he was teasing, when he immediately cut away a large portion of the flesh about the wound, and did not feel any unpleasant result. Profuse bleeding tends to convey the poison out of the wound, and a hand treated in this way can be placed with advantage in hot water. It is very probable that in the instances where antidotes have appeared to save life it is not to be traced to them, as the action of the poison is sometimes—though rarely—mysteriously uncertain. A person or animal may be bitten by a deadly snake and yet not die; the poison

¹ "From 1849 to 1855 there were sixteen deaths from elephants, fifteen from buffaloes, six from crocodiles, two from wild boars, one from bears, and sixty-eight from snakes."

² Speech of Mr. Duff in the House of Commons.—Dr. Fayrer, p. 36.

³ Griffiths, *Animal Kingdom*, 1831. Gumillia says, "the Indians of Orinoco burnt gunpowder on snake wounds."—Nat. Hist. Orinoco.

may be expended on the clothes or hair through which the fangs pass. There is no better protection from a fatal bite than thick cloth or flannel, which soaks up the poison.

Among the remedies named are *Ophiorhiza mongoos*, *Nux vomica*, the seeds of which the Malabars are said to take in small quantities as an antidote to cobra-bites; iodine, eau de luce, and arsenic, which forms the chief ingredient of the Tanjore pills, much praised by the Hindus; also *Aristolochia indica*, one of the bitter-worts. Snakes are said in South America to die in convulsions if the juice of *A. anguiceda* be placed in their mouths; and according to Dr. Hancock the "guaco" of the Caraccas, a celebrated remedy in the Western world, is made from *Aristolochia longa*, which is also employed by Egyptian jugglers to stupefy snakes. Liquor ammoniæ injected into the veins of the patient, as suggested by Dr. Halford, of Melbourne, in Australia, is stated to have been very successful in that colony and India. The "Bengal Medical Gazette" says out of 939 cases of snake-bites in which ammonia was administered, 702 are reported to have recovered. The average length of time between the bite and the administration of ammonia was three and a-half hours in the recoveries, and four and a-half in fatal cases.¹ It is not explained whether the ammonia was injected in all these instances into the veins, or taken internally as a stimulant.

Dr. Fayrer found that injections of ammonia were worse than useless. He also experimented with strychnine, and found that in some instances it accelerated the death of the bitten animal; also that this powerful poison, even in minute quantities, is as fatal to a poisonous snake as it is to other animals. Carbolic acid is also very fatal to them. A small cobra, inoculated with one drop, died in five minutes. A *Bungarus fasciatus* died in ten minutes from inhaling a few drops poured on its cage. This substance, which is a kind of creosote, would be useful in houses to keep them off.

The remedy most prized by the natives is the snake-stone, which is supposed to be a piece of bone or horn, charred in a particular manner; they are very black, about the size of a

¹ Quoted in "Nature," Nov. 1871, January, 1872.

broad-bean, flat and round. When applied to the wound the stone adheres closely to the skin for a few minutes and then drops off. In some instances it is successful.

Dr. Fayrer thinks it probable that animal charcoal, when instantly applied, may absorb the poison, but he found them as powerless in a real bite as any of the so-called antidotes; and Dr. Davy also found them of little use.

The "piedra ponsona" of Mexico is described as being made of a piece of stag's horn, enveloped in grass, enclosed in a sheet of copper, and calcined in a fire.¹ Sir E. Tennent brought home some snake-stones, and submitted them to Professor Faraday for examination. He says they are a piece of charred bone, yielding when burnt a white ash composed of phosphate of lime. Traces of blood were detected in one, probably that of a person to whom it had been applied.

It is not known when this specific for snake-bites was devised; if an invention of the Hindus it is likely to be one of antiquity. Tavernier speaks of serpent-stones, but did not know where they came from. One kind was found in cobra's heads. Query, was he not alluding to the legend already mentioned? Baldaeus, the Dutch minister in Ceylon, 1660, says the "adder's-stone surpasses all remedies for snake-bites, but it is often adulterated. The right sort raises no bubbles when thrown into water, and sticks close to the skin." Thunberg mentions their use at the Cape in 1776, being brought there from Malabar. They were black with grey speckles, and threw out bubbles when put into water, and turned milk blue, which purified them. He sold some which he brought from Ceylon for one écu. The Hottentots when bitten by a snake also rubbed a toad on the wound.² Dr. Davy says he was told by Sir Alexander Johnson that snake-stones were made by the monks of Manilla. If so, they very likely learned the art from the Mexicans, which would give them a Western instead of an Eastern origin. Dr. Ainslie, in his "Materia Medica of India," states that they are made of bezoar.

'Dr. Fayrer's elaborate experiments corroborate those of

¹ Hardy, Trav. in Mexico, 1830; Davy, Cey., p. 100.

² Thunberg, Trav., p. 439; Chur. Coll. Voy., iii. 800.

Russell made in India many years since, and show how venomous is the poison of some snakes. It may be diluted in water, ammonia or alcohol, or dried on slips of glass and kept for months without destroying its fatal properties. It has been brought to England and found to be quite as effective on animals as when it flowed from the reptile's fangs in India. The poison is obtained from snakes by making them bite through a thin leaf stretched across a mussel-shell, when the poison—a yellow oily-looking liquid—runs down the grooved tooth into the shell. Half a drachm can be collected from a cobra. It has been tried on fish, frogs, snails, birds, reptiles, and animals, all yielding to its venom. Cold-blooded animals are less affected by it than warm. Birds succumb soonest, and cats are not so susceptible as other animals. The most rapid deaths from a cobra occurred with fowls, one dying in thirty-four seconds, the usual time being much longer. With human beings in a few instances death has taken place in fifteen and twenty minutes, but the ordinary period varies from three to forty-eight hours. A gunner of the Royal Artillery died in Burmah from the bite of a *Daboia* in forty-eight hours. Snake poison was supposed to be innocuous when there is no wound, but it is fatal when applied to the mucous membrane of the eye of an animal, therefore great caution is requisite when operating with it.

Venomous snakes have no effect on each other as a general rule, but there are exceptional cases when a large poisonous snake will kill a smaller one less venomous. Venomous snakes, however, are usually very effective on non-poisonous species. A tree-snake died from a cobra-bite in two minutes, and a rat-snake in twenty-one minutes, while another survived.

The *Daboia Russelli*, or "Tic-polonga" of the Sinhalese, is a viperine snake, much dreaded both in Ceylon and the peninsula. There is only one species, and they are found from four to five feet long. The body is very thick, and the head rather small, but the fangs are larger than those of a cobra. In Ceylon they are a dark, dull grey, beautifully marked, with a series of black circular or oval rings, edged with a pale colour. The abdomen is white, with black spots. It is very sluggish, diffi-

cult to rouse into activity or induce to bite, and hisses very much when irritated. The "tic-polonga" is rather rare in Ceylon, but appears to be more common in the Peninsula, where it is known as the "cobra monil," a name given, Jerdon says, by the Portuguese, from the markings on its back resembling a neck-lace. Other versions of this title have been given, but are less probable. Dr. Fayrer found the snake-men much more afraid of a Tic than the cobra, and they would not take them by the neck as they did the other. Their poison appears to be less in quantity than a cobra's, and the effect different, acting more on the nervous system, producing collapse sooner, but death is usually longer in taking place. The Tic has the power of continually inflicting mortal wounds, and of rapidly secreting fresh poison, the cobra being exhausted sooner, and taking a much longer time to renew its power.

Dr. Davy, when experimenting on Ceylon snakes, found the cobra less venomous than Dr. Fayrer found them in India, which may have proceeded from his having adopted a different mode of making them bite, but there was not much difference in the *Daboia*. A rat died instantly from its bite. The same snake killed a fowl soon after in less than a minute, and another the next day in thirty seconds, and remained 145 days without food.

The "Mala carawalla" of the Sinhalese, *T. hypnale*, is a small viperine snake, from twelve to eighteen inches long, much dreaded in India and Ceylon by the natives, but does not appear in reality to be very dangerous. The "carawalla" is common in the island, and easily recognised by its peculiar shape, being thin about the neck and body, with an angular head. The back is a brown-grey colour, with dark velvety markings pointed towards the head; under part a silvery white. This snake is very active, and hisses loudly when irritated. Dr. Fayrer did not experiment with them, but Dr. Davy found that a dog bitten by one recovered in forty-eight hours after being much affected by the poison. A fowl bitten the next day by the same snake died in four days, and a frog, a fortnight after, in five hours.

Sir E. Tennent has placed the *Daboia*, and "carawalla," in

his list of snakes peculiar to Ceylon (vol. i. 204), and the error is repeated in "The Natural History." He also gives it as the opinion of the natives that the *Daboia* ascends trees, which is very improbable.

The green carawalla (*Trimeresurus trigonocephalus*), is another viperine snake, closely allied to the *hypnale*, whose bite is not considered very dangerous, although the Indian varieties are more venomous, as the *T. carinatus*, which causes great suffering for several hours to a human being; and *T. gramicus* can kill a fowl in eight minutes. The *Trimeresurus* is a bright green colour, with a black band along the back. The end of the tail is black, and there is a dark line on the side of the head, which is large and triangular. The body is fine about the neck and attains a length of thirty inches. They prey on tree-frogs and mice, being partly nocturnal and arboreal in their habits, and have a contracted pupil. Dr. Gunther says the green carawalla of Ceylon is a form peculiar to the island.¹ However, this may be, it bears a great resemblance to the Indian variety *T. gramineus*, the "bodroo pam" of Russell, as described by Dr. Cantor in his list of Malayan reptiles, J. A. S., Bengal, 1847. The dark markings and line along the back is caused by the under skin being black, which shows through the outer one in some places. Dr. Davy, who gives a similar description, considered them the same.

This family are all fierce in their natures, being apt to bite, and belong to the *Crotalia* genus, of which the famous rattlesnake of America is a member, reputed to be more poisonous than a cobra, and are considered by some to be oviparous.

It is very doubtful if the *Bungarus fasciatus*, an Indian colubrine snake, entered in Sir E. Tennent's list, be found in Ceylon, but only a variety said to be peculiar to the island, *B. Ceylonicus*, Gunth., forty inches long, annulated with eighteen or twenty broad black bands, with narrow white intervals spotted black, which, if not identical, greatly resembles another Indian variety *B. candidus*, known as the "Krait," nearly as fatal as the cobra.² The *Fasciatus* is easily recognised, from being

¹ Reptiles of Brit. Ind.

² Kelaart has *B. candidus* in his list. Dr. Gunther says the *B. fasciatus* is not a Ceylon snake.

annulated with alternate bright yellow and blue-black bands, having a metallic lustre. Its bite is less fatal than the "Krait."

Dr. Davy, who examined many Ceylon snakes, found only four venomous, and but two fatal to man. He appears to have been unacquainted with the *Bungarus*, and its amount of venom remains to be ascertained.

The Hindus have been long aware, although it was not generally known, that some snakes eat each other. Mr. Blyth says the *B. fasciatus*, called "Raja-samp" by the Hindus, lives entirely on snakes, especially cobras; and Dr. Gunther states that he found a *Uropeltis* inside a *B. Ceylonicus* sent home from the island. The *Ophiophagus elaps*, a large hooded snake of India, is also a great devourer of other snakes.¹

The largest of the Ceylon snakes is a species of python, or rock-snake, called the Ceylon boa, measuring from twelve to eighteen feet in length, of a bright yellow and black colour. They are very thick in the body, and have large jaws, which dilate wide enough to swallow a small animal. On each side of the body near the tail are two little spurs connected with strong muscles, which help them to move along. Although immensely strong and courageous they are quite harmless, and are frequently seen about Colombo and the cinnamon gardens, preying on small animals. They are fond of basking in the sun, on rocks near the sea-shore, and can climb well. It is doubtful whether the Ceylon rock-snake is the *Python reticulatus* or *P. molurus* of India, but most probably the latter. Theobald, in his catalogue of Burmah reptiles, Journ. Linnean Soc., 1870, says the *P. reticulatus* does not extend further west than Burmah. It has a black line along the head and neck. Very fabulous stories have been circulated about the boa, or anaconda. It rarely attains twenty feet in length, and never attacks man or the larger animals.

Rat Snakes.—*Pythas muscosus* are common about houses, performing the part of cats, preying on rats and mice. They are quite harmless, frequenting the roofs and ceilings at night,

¹ J. A. S. Beng., 1860, 99; Ann. N. H., 1850; Dr. Fayerer, Thanat.

chasing rats, where fierce struggles take place between them, and as the ceilings are often only mats spread on joists, the combatants sometimes fall through on to the floor in a manner rather startling to the nerves of a new arrival unaccustomed to these midnight performances, as few people like the idea of having any kind of snake in such close proximity. Oil-lamps are always kept burning in bed-rooms at night, in anticipation of these little contingencies. Rat snakes are large and powerful reptiles, of an olive-brown colour, and attain a length of seven feet in India, but those of Ceylon are of more moderate dimensions, and Mr. Blyth says are a different species (J. A. S. Beng., 1854).

Uropeltidæ, or Shield Snakes.—Under this general name are included several genera of curious burrowing reptiles, sometimes found four feet under ground in sand-hills and other places, they are usually of small size, only a few inches in length, not often exceeding a foot, and of a dark brown colour above, having rostral shields or horny coverings to their noses and heads, similar to burrowing lizards and blind snakes; their eyes and mouth are very small, being unable to open them to any extent.

Their chief peculiarity consists in having truncated bodies, looking as if their tails had been cut off—some in a sloping direction, and others straight. There are also a few with a tail ending in a blunt point. Those with a blunt tail, or cut off in a very sloping direction, are classed as *Rhinophis*. The *Silybura* have an oval termination to their bodies, and the *Uropeltis* circular. Many of these reptiles have been found in the hill districts of the island, one or two being peculiar to it; the others are also found in Southern India. Dr. Gunther¹ says, none of the *Silybura* have been found in Ceylon but only in Southern India; however, he describes one from the island (*S. Macrolepis*) in the Annals Nat. History (1862, p. 54), Dr. Gray has *S. Ceylonica* in his work on Lizards. Ed. 1845.

The first to describe *Uropeltis* as natives of Ceylon, under the name of *U. Ceylonica*, was M. Cocteau, in the "Zoological

¹ Reptiles of Brit. Ind., p. 191, ed. 1864; Gray, Ann. N. H., 1858, 378.

Magazine," 1833; they are also mentioned in Captain Laplace's first voyage round the world in the French frigate *Favourite*, 1832. Sir E. Tennent adduces these reptiles "as a further illustration of the affinity of the fauna of Ceylon to that of the Archipelago;" but they are now said to be only found in Ceylon and Southern India, and it is very probable that the one described by Cuvier came from Ceylon, and not from the Archipelago as he supposed.¹

Blind Snakes.—There are two varieties of the genus *Typhlops* having only rudimentary eyes, more or less covered with skin, a horny nose and small mouth, their bodies and tails are short and round, of a brown colour, and covered with imbricate scales. One (*T. merus*) is peculiar to Ceylon. Blind snakes are also found in Southern India and Malay.

Cylindropis are half-burrowing snakes, with rudiments of hind legs hidden in a small groove, and are about thirty inches long, of a brown colour with white bands or spots or network of dark lines, only one species, (*C. maculata*) has been found in the island.

The family of small ground snakes, called *Calamaria*, some of which are found in Northern India,² and very numerous in the Malay provinces, have not yet been noticed in Ceylon, where their place is taken by a similar genera, called *Aspidura*, all peculiar to the island and very common. They are of small size with stout bodies, small eyes, and an olive colour with dark longitudinal stripes or spots. They are found under stones.

Hydrophis.—Sea snakes are not so numerous in Ceylon as in India, being chiefly found about Manaar and the north, where large shoals of them are seen floating on the sea in calm weather. They have generally very long bodies and flat oar-shaped tails for propelling themselves through the water; their heads are small and pointed, and the thickest part of their bodies is near the tail. There is little doubt they are all very venomous. Dr. Fayrer found that a *H. cyanocinctus* killed a fowl in fourteen minutes. This is a very large snake,

¹ Gray, Pro. Z. S., 1858, 262; Tennent, N. H. Cey., 303.

² Dr. Cantor, J. A. S. Beng., 1847; P. Z. S., 1839.

six feet long, of an olive colour on the back with yellow sides and abdomen. A sailor of H. M. S. *Algerine* died in four hours at Madras, and the master of a merchant vessel in seventy-one hours at Moulmein, from the bites of sea snakes. Sir E. Tennent says, "sea snakes have fangs and are therefore poisonous, but happily they cannot open their mouths widely." However it is clear they can open them wide enough to inflict a deadly wound. The scales of sea snakes are quite different from others, being hexagonal. *Pelamys bicolor* is a remarkable species, only twelve inches long, half black and half orange-colour, and very poisonous, killing fowls rapidly.

In the "Journal of the Linnean Society" for 1868 there is an account and drawing of an extraordinary double-headed sea snake (*H. sublaevis*),¹ caught near Madras, twelve inches long. According to the natives they are not uncommon.

Homalopsidæ.—Freshwater snakes are very common in the lakes and ditches of the fort of Colombo and similar places, swimming with their heads above water, breathing through their nostrils, which are on the tip of the nose, like sea snakes and crocodiles, they have forked tongues, are a black colour above and viviparous. *Atractium schistosus* is an intermediate species between true water snakes and *Tropidonotus*, a genus of snake frequenting the edges of rivers, tanks, and marshy places, preying on frogs and aquatic animals; they have stout cylindrical bodies, flat heads and wide mouths, and can swim well, but their nostrils are not on the upper part of their nose as in true freshwater snakes. They are a brownish-grey on the back, spotted with black, varied with red and yellow in some varieties.²

Tree Snakes.—There are several families in the island of tree or whip snakes, as they are variously called, some being nocturnal. They all live in trees, where they prey on lizards, geckos, tree frogs, and small birds, and have exceedingly slender forms, resembling the lash of a whip—those of a brown colour might be easily mistaken for one; none of them

¹ *H. cyanocinctus*, Daud.

² Cantor, J. A. S. B., 1847, 936.

exceed forty inches in length, being much longer in India. Their eyes are large and fascinating and have long heads, generally ending in a very pointed nose or beak. Wonderfully active in their movements they disappear in an instant, winding over the branches with extraordinary rapidity, generally making their escape the moment they perceive any person, but sometimes they will remain a short time and fix their gaze on you, which is intense, and very probably have the power of fascinating small birds, who die from fear before they are in their grasp; they are sometimes found coiled up in the nests of the birds they have despoiled. Nothing can exceed the beauty of the colouring of the diurnal varieties presenting the varied hues of purple, bronze, brown, green, and yellow; some are all green tinged with bronze, as the *Passerita mycterizans*, and can hardly be distinguished among the foliage where they dwell. One variety (*P. purpurascens*) a purple and brown colour, shot, is supposed to be peculiar to Ceylon.

The *Dendrophida* are chiefly distinguished by their teeth, having three pairs resembling fangs. The *Dipsas* also have large teeth and can bite severely, but none of them are perforated.

The *Dipsas*, or *Dipsadomorpha*, are a nocturnal species, having large heads and eyes with vertical pupils, and are generally of dull colours. There are only two varieties of this genus in the isle. *D. Ceylonicus* is an olive-grey colour, minutely spotted with black, and, unlike most tree snakes, has a broad nose.

Batrachia.—Ceylon is very prolific in frogs, presenting many varieties, in extraordinary numbers, some of great size and brilliant colours, green, yellow, orange, and red. The majority are peculiar to the island, and cameleon-like can change colour—doubtless a provision of nature to protect them from their numerous enemies, being much preyed on by birds and snakes. In many parts of the island it is impossible to sleep from the loud croaking of frogs that continues during the whole night, proceeding apparently from tens of thousands of these creatures, every variety of croak it is possible to conceive joins to swell into the most infernal discord imaginable. The canal or ditch that ran through the fort of Colombo was

famous for these nightly frog concerts; during the day and dry season they are not much heard, for they either become torpid, hid away in holes, or move off somewhere else.

The true rana, or *batrachia*, when young, have no resemblance to frogs, having long bodies and tails with large heads, and live in the water, breathing as fish do through gills or integuments, but when about three months old they undergo a remarkable transformation, lungs being developed and the gills disappearing when they become amphibious.

The *Rana cutipora*, found about Trincomalee, attains a great size, being from five to eight inches long. The Newera Ellia frog of Kelaart is a very small bright green reptile, with white spots and a pale medial line, which changes at times to a purple-brown, also found in the Nilgherries.

Bufo.—Only three species of toads have been discovered in Ceylon. The Indian toad (*Bufo melanostictus*), an orange colour with black spots and head, changing to red or brown when alarmed, is common in the maritime provinces. *B. Kelaartii*, a very small species, peculiar to the island, is found in the south. Toads have a milky-looking fluid about their mouths, which they can squirt out to some distance, it has a very offensive odour, and was long supposed, though erroneously, to be poisonous.

Tree Frogs.—As their name implies live chiefly in trees, and are furnished with a disk to their toes like geckos, some are partly web-footed. Tree frogs are of various colours, brown, green, and buff; some are spotted and others streaked with black; but they generally assume a colour to harmonise with the objects they remain on. The family named *Ixalus*, of which there are many varieties, are all remarkable for their bright colours and small size. One (*I. leucorhinas*) is only three-quarters of an inch long.

Burrowing Batrachia.—A strange reptile (*Cæcilia glutinosa*), resembling a huge worm, fifteen inches long, with a smooth viscous skin wrinkled into several hundred annular folds, which for some time puzzled naturalists how to class it, is now said to be a *Batrachia*,¹ the young undergoing a partial metamor-

¹ Gunth., Rep. of Brit. Ind.

phosis, but both old and young live in the ground like worms. They have a flattened head, a cleft mouth with teeth, and rudimentary eyes, hidden under the skin. Several varieties have been found in Ceylon, Southern India, the Kassia Hills, and Java.

CHELONIA.—Aristotle describes three groups of chelonia or reptiles with horny coverings, sea, land, and freshwater species. They are divided by modern naturalists into four or five families. Some are furnished with limbs resembling fins suited for swimming, as the *Chelonia* or turtles, who live chiefly in the sea; others, as the land tortoises (*Testudo*), have feet and claws suited for walking on dry surfaces; while the marsh and pond tortoises, or “Terrapins,” have feet and claws, with a web between the toes, which enables them to swim, crawl, or climb. Some of the land tortoises are vegetarians, living on grass; the marsh and pond tortoises are partly carnivorous, eating small reptiles; they all deposit their eggs in sand or holes, which they make with their feet.

Aristotle¹ noticed the extraordinary vitality of the turtle, which can be cut up piecemeal without killing it, and can live for some time even after the heart is removed; the accuracy of his statements is put to the proof in Ceylon, where they are sold in the markets by portions, which are cut off the living creature until none is left in the shell, vitality remaining to the last.

A variety of the Indian green turtle (*Chelonia midas*) is found in great numbers all round the coast, and in some places attains a great size. They are much eaten by the natives, notwithstanding that they are often poisonous, and many deaths have occurred from their use; they also devour quantities of their eggs, which are round, soft, and semi-transparent—a turtle will lay from one to two hundred.

Several ancient writers² allude to the enormous size of the turtles in Ceylon and India. Pliny (ix. 11) states they were large enough to roof a house; and Strabo (xvi. 733) says, when turned upside down they made boats; according to

¹ “De Vita et Morte,” ch. ii., Tennent. ² Ælian, xvi. 17; Megasthenes.

Diodorus Siculus, these immense creatures furnished the *Chelonophagi*, or shell-fish-eaters, with food, houses, and boats. As it is not possible the modern turtle could have degenerated to its comparative moderate dimensions, these stories probably originated in the discovery of some of the gigantic fossil tortoises that have been found in several parts of India, which measure twenty feet in the curve of the carapace. Some very large live species have been recently brought from the Seychelles.

The hawk's bill turtle (*Caretta imbricata*) is also eaten by the natives, although more unwholesome than the other, but is chiefly valued for the sake of its beautiful scales, thirteen in number, which form the tortoise-shell of commerce. Many handsome hair-combs are made from them at Galle, with which the Lowland Sinhalese decorate their hair, not being considered in full-dress without one stuck in the knob at the back of their heads.

The poor turtles are made to suffer for man's vanity in the most barbarous manner, the shell if taken from them when dead being considered a bad colour, they suspend them alive over a wood-fire until the scales drop off, when they are liberated. At particular times of the year they come up the mouths of rivers about Matura and Hambantotta, and crawl over the banks for the purpose of depositing their eggs in the sands, when they are caught with such facility that they have become scarce, a good one being worth £4. It is a habit of this creature to always return to the place where it was hatched: even those deprived of their shells are said, notwithstanding the cruel treatment they experience, to return again with new shells on them, some having been marked to verify this strange circumstance—it is however very doubtful if the shells could grow again.

In the Celebes the tortoises are first killed and then dipped in boiling water to remove their shells, which preserves their fine colour quite as well as the other barbarous method.¹ Tortoise shells are one of the earliest exports from the island

¹ Jour. of the Archipelago, 1849, iii. 227.

of which there is any record, being mentioned by Strabo (ii. 1, 14). Pliny says, Cornelius Pollio, a man of profligate habits, was the first to carve tortoise-shell. The demand for them in the island is now so great that the export has ceased, and they are imported from Penang and the Maldives.

A very prettily marked land tortoise (*Testudo elegans*) is common in low grassy places, where they hide. Their convex shells are black with yellow rays. The head and feet are also yellow. *Emys trijuga* and *Emyda Ceylonicus* are two species of terrapins, very common in tanks and marshes, the latter is a large size being thirteen inches long, of an olive-green colour, they are both put by the natives into wells as scavengers to clear them of insects, and hybernate when brought to Europe, although they do not do so in the island. The *Emys trijuga* is more strictly a terrapin than the marsh variety, and cannot live long without water, being almost entirely a pond tortoise.

LIST OF CEYLON REPTILES.

* Peculiar.	† New species.	Doubtful.
<i>Crocodylus palustris</i> , Less.		* <i>Nessia Thwaitesii</i> , Gunth., A. N. H., 1872.
<i>byporeatus</i> , Cuv.		* <i>Burtoni</i> , Gray.
<i>Testudo elegans</i> , Schop.		* <i>monodactyla</i> , Gray.
<i>Emys trijuga</i> , Schw.		<i>Acontias Layardii</i> , Kela.
* <i>Emyda Ceylonicus</i> . Gray, P. Z. S., 1855.		<i>Hemidactylus frenatus</i> , Schleg.
<i>Caretta imbricata</i> , Linn.	*	<i>triedrus</i> , Less., frequents ant-hills, olive brown, rare.
<i>Chelonia virgata</i> , Schw., <i>C. midas</i> , Gray.		<i>maculatus</i> , Dum., <i>H. piresii</i> , Kela., small spines along back.
<i>Hydrosaurus salvator</i> , Wagl.		<i>coetazei</i> , Dum., <i>B. sublaevis</i> , Gray, by the J. A. S., Beng., 1852, trees and houses.
<i>Monitor dracæna</i> , Linn.		<i>Leschenaultii</i> , Dum., long-nosed gecko, omitted as a Ceylon species by Gunther. Blyth says some were sent from the island by Layard, J. A. S., Beng., xxi. 353. Very common in Southern India, Jerd., J. A. S.,
† <i>Riopa punctata</i> , Gray, <i>Eumeces punctatus</i> of Gunth., he doubts if in Ceylon, p. 93, dotted.		
<i>Mabouya elegans</i> , Gray, E. Hardwickii of Gunth., p. 92.		
<i>Tiliqua rufescens</i> , Gray. <i>Euprepis rufescens</i> Cantor, Gunth. p. 79.		
<i>Eumeces taprobanes</i> , Kela., <i>Lygosoma fallax</i> , Pet., of Tennent.		

- Beng., 1853, p. 468, resembles *H. frenatus*.
Peripia Peronii, *Dum.*
 **Gymnodactylus kandianus*, *Kela.*
 †*frenatus*, *Kela.*, J. A. S. Beng., 1852.
 †*triedrus*, *Gunth.*, p. 113.
 kandianus, *Kela.*, p. 52.
 ††*monarchus*, *Dum.*, a large Archipelago species added by *Gunther*.
 Qy. if in the island, *Gecko monarchus*, *Gray*, p. 161.
 †*Nycteridium Schneideri*, *Gunth.*, sent from Ceylon by *Kelaart*.
 *†*Geckoella punctata*, *Gunth.*
 Sitana pondiceriana, *Cuv.*
 var. *minor*, *Gunth.*
 **Lyriocephalus scutatus*, *Linn.*
 Calotes ophiomachus, *Gray*, C. *viridis* of *Kelaart*, p. 171.
 versicolor, *Daud.*, *nigrilabris*, *Peters*, C. *rouxii*, *Dum.*, of *Tennent* mistaken for it, *Gunth.*
 mystaceus, *Dumer.*
 †*memoricola*, *Jerd.*, *Gunth.* p. 141.
 †*liocephalus*, *Gunth.*
 Salen Jerdonii, *Gray*, Ann. Nat. Hist., 1846.
 †**Cophotis Ceylanica*, *Peters.*
 **Otocryptis bivittata*, *Wieg.*
 **Ceratophora Stoddartii*, *Gray.*
 **Tennehtii*, *Gunth.*
 †*aspera*, *Gunth.*
 Chameleo Zeylonicus, *Laur.*
 Naja tripudians, *Merr.*
 Daboia Russelli, *Shaw.*
 Trigonocephalus hypnale, *Wagl.*
 Hypnale nepa, *Gunth.*
 **Trimeresurus trigonocephalus*, *Gunth.*,
 T. *viridis*, *Gray*, of *Tennent*.
 Bungarus Ceylonicus, *Gunth.*, B. *can-*
 didus, *Linn.*, of *Kelaart*.
 Python molurus, *Gray*, qy.
 Rhinophis oxyrhynchus, *Schn.*, *Dapat*
 naja lankadiva of *Kelaart*, *Mity-*
 lia unimaculata, *Gray.*
 punctatus, *Muller.*
 Philippinus, *Gunth.*, *Typhlops*
 Philippinus, *Cuv.*
 **Trevelyanus. Dapatinaja*, *Trev.*, of
 Kelaart, M. *Gerrardii*, *Gray*,
 Ann. Nat. Hist., 1858, p. 378.
 homolepis, *Hemp.*
 **Blythii*, *Kela.*, M. *Templetonii* and
 M. *melanogaster*, *Gray*, P. Z. S.,
 1862.
 planceps, *Peters*, Ann. Nat. Hist.,
 1868.
 Uropeltis grandis, *Kela.*, two var.,
 pardalis and *saffragamis*, *Kela.*,
 U. *Philippinus*, *Cuv.*
 Silybura macrolepis, *Peters*, Ann. N .
 Hist., 1862.
 Ceylanica, *Peters*, U. *Ceylanica*,
 Cuv., S. *Ceylonica*, *Gray*, ed.
 1845.
 Hydrophis lapemoides, *Gray*, *Aturia*
 lapemoides of *Tennent*.
 †*Hardwickii*.
 †*Lapere*.
 †*Elliotti*, *Gunth.*, *ornata*, *Gray.*
 cyanocinctus, *Daud.*
 †*Holdsworthii*, *Gunth.*
 Pelamys bicolor, *Daud.* H. *pelamys*,
 Schegl., has a wide range, being
 found in New Zealand, Mada-
 gascar, and Panama.
 Cerberus cinereus, *Daud.*, *Gray.*
 Atretium schistosus, *Daud.* *Tropi-*
 dophis schistosus of *Tennent*
 also found in Malay, J. *Linn.*
 Soc., 1870.
 **Tropidonotus Ceylonicus*, *Gunth.*,
 olive brown, 20 yellow ocelli.
 quincunciatus, *Schleg.*, *Umbratus*
 of *Kelaart*, has a wide range.
 var. *funnebris*, black.
 var. *carinatus*, scarlet spots.
 stolatus, *Linn.*
 Ceylonensis, *Gum.*, a var. of *Chry-*
 sargus.
 **Cylindrophis maculata*, *Wagl.*
 **Aspidura brachyorrhos*, *Wagl.*
 **Copii*, *Gunth.*
 **trachyprocta*, *Cope*, Ann. Nat.
 Hist., 1863.
 Haplocercus Ceylonicus, *Gunth.*, very
 long and slender.
 Oligodon modestus, *Gunth.*

**Oligodon sublineatus*, *Dum.*

Templetonii, *Gunth.*, small ground snakes with strong teeth and slender form, brown colour with pale vertical bands.

Simotes Russellii, *Daud.*, olive brown black bands edged with white.
purpurascens, *Schleg.*, *Xenodon purpurascens* of Kelaart.

var. *albiventer*, *Gunth.*

Ablabes Humbertii, *Gunth.*, p. 223, reddish olive ground snake.

Cynophis Helena, *Daud.*, a large ground snake, preys on mice and small reptiles, *Ann. Nat. Hist.*, 1848, p. 247.

Pytas nuscusosus, *Grey*, *Colomber Blumenbachii*, *Mcrr.*, *C. korros* of *Blyth*, *J. A. S.*, *Beng.*, 1854, 291, and *Tennent*.

Cyclophis calamaria, *Gunth.*, a grass snake of a greenish colour, a var. in *Japan*, *Ann. Nat. Hist.*, 1868.

Chrysopelea ornata, *Dum.*, two var., one dark with black cross bars, another grey with yellow and black bars.

Dendrophis picta, *Schleg.*

†*caudolinelcolatus*, *Gunth.*, *Ann. Nat. Hist.*, 1872, p. 14.

Passerita mycterizans, *Gray.*

var. *fusca*, brown whip-snake.

**purpurascens*, *Gunth.*

**Dipsadomorphus Ceylonicus*, *Gunth.*

†*Dipsas Barnesii*, *Gunth.*, *Ann. Nat. Hist.*, 1872, p. 13.

Lycodon aulicus, *Linn.*, a light brown Indian snake with rostral shield, two varieties are found in *Ceylon*, one gray and one brown, both differing from that of the peninsula, *Gunth.*

**Cercaspi carinata*, *Kuhl.*, 2 feet long, dark colour with white rings.

**Typhlops merus*, *Jan.*

braminus, *Cuv.*

Rana hexadactyla, *Less.*, *R. cutipora*, *Dum.*, of *Tennent*.

Rana cyanophlyctes, *Schm.*, *R. Bengalensis*, *Gray*, of *Kelaart*.

†*tesculenta*.

Kuhl., *Schleg.*, the *Ceylon* species differs from that of the *Archipelago*.

tigrina, *Daud.*, *Ceylon* bull-frog.

†*assimilis*, *Blyth*, *J. A. S. Beng.*, xxiii. 732. *R. vittigera*, *Weigm.*

†*Newera Ellia*, *Kela.*

†**Hoplobatrachus Ceylanica*, *Peters*, found in hills, *Ann. Nat. Hist.*, 1872.

**Hylorana maculara*, *Blyth*, *Lymnodytes maculara* of *Tennent*.

**temporalis*, *Gunth.*, var. of *B. maculara*, *Dum.*

†**Namophrys Ceylanicus*, *Gunth.*, *P. Z. S.*, 1868.

Megalophrys montana, *Kuhl.*, head broad and depressed, fingers free, grey colour, *Cantor*, *Malay. Rep.*

Diplopelma ornatum, *Daud.*, a very small species, reddish grey with purple spots.

†*Pyxicephalus breviceps*, no specimen received from the isle, *Gunth.*, p. 412.

†**Ixalus adpersus*, new tree frog, *Ann. Nat. Hist.*, 1872, p. 86.

†**oxyrhynchus*, *idem.*

†**pulchellus*, *idem.*

**variabilis*, *Gunth.*, *idem.*

**leucorhinus*, *Gunth.*

**schmardanus*, *Kel.*, found in hills, very peculiar form.

†**fimbriatus*, *Gunth.*, *Ann. Nat. Hist.* 1872.

†**femoralis* from centre of isle, *Gunth.*, *P. Z. S.*, 1868.

†*temporalis*, *idem.*

†*macropus*, *Ann. Nat. Hist.*, 1872.

†**Polypedates cavirostris*, *P. Z. S.*, 1868, *tree frog.

†**nasutus*, *Gunth.*, *P. Z. S.*, 1868.

maculatus, *Gray*, very common species, *P. cruciger*, *Blyth*, in *Kelaart*.

**Polypedates microtymppanum*.

**eques*, *Gunth.*, a spurred variety.

Rep. Brit. Ind., p. 431.

†*reticulatus*, *Gunth.*

Kaloula pulchra, *Gray*.

obscura.

Bufo melanostictus, *Schn.*

**Kandyana*, *Gunth.*, Ann. Nat. Hist., 1872.

**Bufo Kelaartii*, *Gunth.*, *Adenomus badioflavus*, *Cope*, of Tennent.

Epicrura glutinosum, *Dum.*, *Cæcilia glutinosa*, *Linn.*

Several reptiles are entered in Sir E. Tennent's list which cannot be identified as Ceylon species, for instance, "*Chersydrus granulatus*, *Schn.*," a Burmah snake; "*T. Ceylonensis*, *Gray*, and *T. nigromarginatus*, *Gunth.*," *gy. Schleg.* are entered as distinct species, although only other names for *H. nepa* (*Gunth.*).

CHAPTER XXVII.

INSECTS.

IN tropical climates the smaller reptiles and insects are so numerous and annoying, and are so continually obtruding themselves on your observation, that the most listless observer of animated nature cannot fail to acquire a knowledge of their many singular forms and habits, especially as he will find he has a personal interest in acquiring it, in order to guard against them, consequently every strange insect that presents itself to the unwilling gaze of the new arrival becomes an object of unpleasant interest, probably more naturalists are made in tropical climates than any other, the annoyances of insects and escapes from snake-bites forming a frequent subject of conversation. How many a new arrival is first made aware of the existence of such things as white ants, and of their peculiar habits by discovering some article he had incautiously left on the floor of his room covered with clay and destroyed. In fact you are continually kept on the *qui vive* by some villanous little creature.

The number of species in the island almost defies classification, amounting, it is supposed, to 10,000 different kinds, of which a very small portion have yet been named. Ants are as numerous as the sands of the shore, and there are immense numbers of minute beetles. Flights of butterflies occur in the spring in the vicinity of Ambepusse several miles in breadth, and contain such countless myriads they are several days in passing, flying in a south-eastern direction. The Sinhalese say they go to Adam's Peak, but little is known about them. These annual flights are chiefly composed of *Callidryas*,

Euploea and *Papilio marcellina*, all of a pale yellow or brownish colour.¹

From the prodigious number of insects, the jungles and gardens of the low country present a scene of life and animation only to be found in the tropics, and a continued hum resounds on all sides. This teeming activity is most striking in the morning, its busy hum being succeeded by the hot stillness of noon. In very warm climates many beetles and other insects hide in the day in holes in the earth about trees to escape the sun. Towards evening they again come forth, and, as it deepens into night, myriads of fire flies show their green light in every direction among the foliage.

There is a remarkable change in these scenes of insect life towards the end of the monsoons, when the greater part of them disappear. This time of the year seems to act on many of them as winter does in cold climates; they either die during the extreme heat, previously depositing their ova in some suitable place, which produces a new race under the influence of the rains of the monsoons, or they æstivate in various retreats until then, when the previous activity is resumed.²

The insect fauna of Ceylon is the least known part of its zoology. Any person who undertakes a complete description of it will have a great task to perform; a mere enumeration of names, if names can be found for them, would occupy a small volume. The difference between the insects of Ceylon and Northern India is considerable; Ceylon being so much nearer the equator, many of the forms are quite tropical. Still a large proportion of the beetles and many of the spiders are European. *Bembidiidæ* are as common as in northern regions, and what is remarkable, are most numerous in the warmest parts of the island. It has been remarked—speaking of Southern Asian

¹ Similar flights of yellow butterflies have been noticed in Brazil and other places. Kirby, Entom., p. 296.

² Vide chapter on Fish. The ancient Egyptians thought this reappearance of beetles after the inundations of the Nile, an emblem of a future existence of the soul. "On voit," says M. Jomard, "après la retraite du Nil et la fécondation des terres, le limon couvert d'une multitude de scarabées. Un pareil phénomène a dû sembler aux Egyptiens le plus propre à peindre une nouvelle existence."

insects—that to the north of a line drawn through the Philippines they are largely mixed with European forms; even India, so far south as the Nilgherries, has little of a tropical fauna.¹ Many non-migratory insects are carried great distances by winds and floating timber, and become established in new homes. An instance is reported of a beetle flying on board a vessel 500 miles from the African coast.²

COLEOPTERA.—*Beetles* play an important part in the order of nature. The family of Longicornes are equally destructive of timber trees in northern and tropical climates, boring tunnels through their trunks, and the extension of cocoa-nut plantations has called into increased activity the destructive power of the cocoa-nut beetle (*Oryctes rhinoceros*), causing serious loss to the planters. On a plantation of 150 acres of three-year-old trees there was not a single tree untouched.³

It is remarkable that a sudden increase in the cultivation of some plant towards which man has turned his attention, calls forth a more than proportionate increase in the destructive activity of insects that live on them, which before were only in a normal state. About thirty years ago the cocoa-nut beetle and coffee bug (*Lecanium coffeæ*), although causing some damage to planters, did not produce the wholesale destruction which has happened since.

Extraordinary cavities are formed in trees by longicorn beetles. The larvæ live in the long tunnels which they perforate; in this stage of their existence they are a large pulpy worm, three inches long, and the colour of milk, having a jointed appearance, with asperities in the centre of each joint to enable them to move along. When the larva has attained its full age it makes a cocoon of the gnawed wood, cemented with a gummy secretion. In this cocoon it changes into a pupa, or chrysalis, which is at first the same colour as the larva, and ultimately issues forth the full-grown beetle.

The cocoa-nut beetle, called “cooroomenya” by the Sinhalese, is a pale brown colour, and said to have been brought

¹ Pasco on Penang Beetles, J. Linn. Soc., 1866, p. 223.

J. Entom. S., 1871, p. 178; Linn. Trans., 1861, p. 321; 1872, p. 89.

³ Capper, J. Cey. R. A. S., 1845.

from the Archipelago, where it is equally destructive (*vide* ch. xxxii.). The Malabar coolies, who are nearly as omnivorous as the Chinese, eat the unpleasant-looking larvæ. However, in this they have Scripture on their side, as the eating of beetles is permitted in Leviticus.¹

The *Batocera rubis* is another of the tree-borers, of a brown colour, about an inch and a half long.

In 1861 a new pest appeared on the coffee estates of Southern India, in the shape of a boring beetle, said to be of the *Cerambycida* family, *Xylotretus quadrupes*. It commits great ravages, principally in the dry season; the trees turn yellow, and with the least shake break off close to the ground, the trunks being completely eaten away by the larva, which is a yellowish white with a black head. The beetle is three-quarters of an inch long, with a narrow cylindrical body, small head, and large eyes. The elytra are black, with three angular green streaks, and the abdomen terminates in a short sting-like appendage.

This beetle is mentioned here, because it is said to have been recently noticed in Ceylon, where some new species of coffee borers have also made their appearance. One is described as being the caterpillar of the moth *Zeuzera*, called "the red coffee borer of Ceylon." The larva attacks the trees in the middle of the stem, and works its way through the pith. Another, called the black grub, is supposed to be the larva of the dart moth, *Agrotis segetum*, found in England, where the *Zeuzera æsculi* preys on the ash tree in a manner similar to its namesake on the coffee tree. The eggs are laid on the bark just above where a leaf falls off. The grub when hatched eats into the stem, passing upwards for some distance, when it turns and descends below the point of entry, boring a smooth cylindrical tunnel, diverging towards the bark, which it eats away, leaving only a thin outer skin, and then becomes transformed into a pupa, which easily breaks through when the time of exit arrives.

Eight species of tree-boring larvæ from Ceylon and Southern India were exhibited by Mr. F. Smith at the annual meeting

¹ "And the beetle after his kind you may eat," xi. 22.

of the Entomological Society in 1868. The nature of some was not exactly determined, one was a *Zeuzera*; another, called the "great white borer," looked like a *Zeuzera*. This grub is found about the roots of trees. The others were *Coleoptera*.¹

Many Ceylon beetles have very highly-coloured elytra. Among those distinguished by their brilliant hues, the golden beetle, *Sternocera orientale*, takes the first place from their unrivalled richness and metallic lustre; the green and golden hues are so marvellously blended it is difficult to say which prevails. When seen in the morning sun, fresh from the night, as they clamber over the damp leaves, nothing could be more beautiful. The dark half-caste Portuguese beauties of Colombo place them in their hair. Some are dark blue, as the *Chrysobothrys sutralis*, and others vivid green (*Chrysochroa Brownii*).² *Nyphasia torrida* has rich orange and red elytra,³ *Trichentoma Templetonii* is a large and remarkable beetle of a buff colour with black legs, *Campsosternum Templetonii* has golden green elytra, edged with purple; this is one of the *Elateridæ*, or jumping beetles, having a joint in their back which enables them when placed on it, to spring into the air and get on their feet with a clicking noise. *Buprestidæ* were incorrectly supposed by Linnæus to be the "cattle bursters" of the ancients, who fancied that cattle swelled and died from the effects of swallowing certain beetles, but it has been shown by Latreille that the insects alluded to by them are the *Nylabris* of Fabricius, a species of cantharides.

The family of *Necrophagæ*, or burying beetles, who are so actively employed in Europe in interring dead bodies of small reptiles, are rare in tropical climates,⁴ where their place is taken by ants, who are a host in themselves in this line.

Dytiscidæ (water beetles) abound in all the tanks and fresh waters. When the water in their haunts is dried up, they aestivate in the mud until the periodical rain renews their

¹ Trans. Entom. Soc. London, 1868, p. 165; also the "Coffee Tree and its Enemies," Nietner, Colombo, 1861.

² Saunders, Trans. Entom. Soc., 1872, p. 241.

³ Ann. Nat. Hist., xix.

D'Orbigny enumerates only twenty-three species from the whole of Asia. Dict. H. N., viii.

activity. The hind legs of water beetles being flattened at the end like an oar, they can swim with great ease and are amphibious; a receptacle under the hollow of the elytra contains a supply of air which enables them to dive, swim, or crawl among the plants under the water until it is exhausted, when they return to the shore. They are also provided with wings and fly about in wet weather. Most of the tropical species are named Cybisters; they are nearly all the same shape, a round, oval, and a dark brownish colour, but the elytra of some are grooved lengthways. The sub-family of *Gyrindæ*, or whirligigs, are very numerous and of large size.

Lampyridæ.—The fire-fly is a luminous nocturnal beetle, of a blackish-brown colour, covered with short brown hair, and has a soft body. The light, which is of a greenish colour, rests in the under extremity of the abdomen, and is only perceptible in the dark. During the day it presents the appearance of an ash-coloured spot. When flying they alternately kindle and obscure the light, perhaps an instinct of self preservation; for, if approached at night, they suddenly disappear from sight and reappear some yards off. The cause of this luminous appearance has given rise to much discussion, without its being exactly ascertained what it proceeds from, but it is most probably phosphoric. Cuvier found that the light appeared when they were placed in lukewarm water; but that cold water extinguished it. These charming creations of nature collect at times on the trees in such numbers, that when the wind agitates them they fall in a shower of fire, resembling some pyrotechnical display.

Glow-worms are also numerous. It is considered very doubtful if the larva of the fire-fly is known, or that it is luminous. The glow-worm is said to be luminous in all its transformations. Lieutenant Hobson, in the "Transactions of the Entomological Society," 1866, p. 101, describes what seems to be a new species of glow-worm found at Gampola; "it is two inches long, and as thick as a goose quill, formed of eleven rings, nine of which have two luminous spots on each, making eighteen in all. When touched the insect curls up, looking like a ring studded with lamps; they are very sluggish,

and burrow in damp earth." A glow-worm (*Astraptor illuminator*, Murray), from Rio, South America, described in the "Journal of the Linnæan Society," 1870, p. 74, resembles the one at Gampola, having a series of bright spots on each side of the body, which is formed of eleven segments. The spots near the head are red, caused by some colouring matter in the skin through which it shines. Similar glow-worms have been noticed at Nicaragua.

Carabidæ.—Many of this family in Ceylon resemble those of Burmah. Tropical *Carabidæ* are usually of large size, fierce and carnivorous, preying on smaller insects. Some have no wings, and are mostly ground beetles. Their elytra are chiefly purple, though green, brown and richer hues are found on them. A few have an odour of musk, and others of creasote. A singular variety has been found in the island (*Cyclosomus dyticolides*), shaped like a water beetle, of a chestnut colour. Its habits are not semi-aquatic as one would suppose, as it burrows in dry sandy places.

Bembidiidæ.—Contrary to what one would expect, these are more common in the lower country than in the cool hill region, being very numerous on the banks of the Colombo Lakes. Some have light brown elytra, others black or bronze. *Trigonotomidæ* are common in damp places, and often fly into houses in rainy weather. Some pigmy species of *Ptinidium* have been noticed by M. Nietner, the only Asiatic representatives hitherto found; also a few resembling ants (*Anthicus formicarius*).¹

Cassidiadæ, or tortoise beetles, are named from their elytra being formed like the shell of a tortoise, the legs being drawn underneath; a flat rim in some varieties of a different colour from the centre gives the appearance of a frame, the difference in colour proceeding from their habit of depositing their larva on the rim. Tortoise beetles are very small, and often of bright colours. *C. ornate* is like a ruby enclosed in a frame of pearls.

Copridæ are abundant. These beetles, who live habitually in manure, are generally small and black, but some have

¹ Ann. Nat. Hist., new series, ii. 427; also 1857, p. 272.

brilliant metallic hues. In order to preserve these colours, nature has furnished them with the power of secreting an oil, which prevents the noisome matters amongst which they live sticking to them.

The *Scarabæus sacer*, one of the largest of this family, is called the scavenger beetle in Ceylon, from its making balls of horse dung, which it buries in the earth, having previously deposited its eggs in them, in order that they may be hatched by the heat of the manure. There is nothing more amusing than to watch this operation, and the earnest activity with which it is performed. After the ball has been made, which is often larger than itself, it sets to work to roll it to a sandy place, or where the earth is soft, directing it backwards by means of its odd-looking legs. Arrived at the spot where it is to be buried, it gets under the ball, throwing out the sand all round until it sinks out of sight. They fly with a loud buzzing noise, and have a keen sense of smell. The *Scarabæus sacer* is supposed by some naturalists to be the sacred beetle of the ancient Egyptians, which is engraved among the hieroglyphics on their granite monuments; but this is doubted by others, as Herodotus speaks of one a golden green, some of which were discovered for the first time in 1819 by M. Cail-laund, and are considered to be more probably the sacred beetle than the black one.

LEPIDOPTERA.—Although many Ceylon butterflies are exceedingly beautiful, they are less gorgeous than those of India, South America, and other tropical countries, neither are they all of gay colours; a good many have sombre hues. *Neptes-jumbah* has black wings, with a few white markings, and in numbers white predominates, as in *Papilio Phryne*. Many of them have a wide geographical range, being also natives of China, the Archipelago, Northern India, and a few of South America; they are not very numerous in the higher mountains, and generally avoid the sun, preferring shady gardens and jungles, and cool retreats near water or rivers.

The most beautiful of them is the great black and yellow (*Ornithoptera darsius*), peculiar to Ceylon; the wings resemble rich black velvet, the centre of the lower ones having a large

brilliant, glossy yellow spot; it flies with a languid heavy movement. The larva resembles the back-bone of an animal with short ribs, and is a deep brown colour. This is said to be the only *Ornithoptera* found out of Malay countries.¹ Next in size is the *Papilio Hector*, about four inches across the wings, which are also black and velvety, with carmine spots. They are very numerous. The caterpillar, which feeds on *Aristolochia*, is a rich brown, with a number of scarlet spikes all over the body. *Papilio Polydorus*, a variety of *P. Hector*, has a few rays of carmine or yellow instead of spots on the wings. *Papilio Polymnestor* has the upper wings black, and lower ones blue, and flies rapidly; the larva has not the least resemblance to a caterpillar, having large eyes like a dragon-fly, and a curious hump on the back resembling a buckle, and of a deep green colour. A butterfly called the sylph by the Europeans (*Hestia Jasonia*) has semi-transparent wings, and haunts cool shady places near the margins of rivers and mountain streams. *Chalcusia thallo* is named the little black and white butterfly.² The *Lycenidæ* are a very attractive family of small butterflies, having short bodies, and a peculiar metallic lustre of wing as they flit about in the sun; their colours are chiefly pale blue or purple, but some are quite white, as *Castalius rosiomon*.

Westwood, in his "Illustrations of Oriental Entomology," has depicted a few of the most charming and rare of Ceylon butterflies. The *Limacodes graciosa* is distinguished by alternate brown and green bands on the outer wing; *Amathusa philarchus* by broad silvery fascia on a blue-black wing; and *Charaxes psaphon* by rich fulvous wings edged with black.

Moths.—As soon as the sun sets a multitude of hawk-moths³ make their appearance, passing with rapid flight from plant to plant during the short twilight, when they disappear, and are succeeded by the *Bombycidæ*, or night-moths. Unlike many of the brilliant papilios that revel in the daytime, most of the nocturnal moths in colour resemble the plumage of owls, some

¹ Wallace, J. Linn. S., 1866.

² Horsfield's Cata., E. I. Museum.

³ So named from their strong flight, the *Hesperidæ* of Linn., distinguished by four spurs on their hind legs, and thick bodies.

being perfectly white, as the *Bombyx mori*, or real silk moth; but a few of the Indian *Saturnia* have richer hues than those of Ceylon. The most remarkable of the moths is the *Acherontia morta*, named from the curious representation of a "death's head" on its shoulders. The colour is a rich brown, and marked like a tortoise-shell. This insect utters a plaintive cry when seized, which Reaumur supposed to be caused by the friction of the palpi against the proboscis. Mr. Moseley thinks the noise proceeds from air rushing through a hole in the head.¹ The caterpillars are a large size, and of a green colour, with several transverse yellow bands, and a flexible horn on the front of their heads. They are fond of the tobacco plant. A very large atlas moth (*Phalæna Atlas*), eight inches across the wings, is common in the gardens about Colombo. They have a remarkable silvery talc-like spot on each of the larger wings.

Several of the Tusseh silk moths of India are found in Ceylon—one, the *Phalæna rincini*, is six or eight inches across the wings, and of a buff colour; the caterpillar feeds on the *Ricinus*, or castor-oil plant, country almond, *Terminalia Cattappa*, and *Ficus religiosa*. Vast quantities of these moths' cocoons are obtained by the natives in the forests of Upper Assam, from which they manufacture the Tusseh silk.² The cocoons being found in trees, explains the lines in Virgil:—

"Velleraque ut foliis depectant tenuia Seres."³

Herodotus also says silk was a kind of wool that grew on trees (iii. 106). The Portuguese and Dutch tried unsuccessfully to establish the culture of silk in Ceylon, both with the Tusseh and true silk-moth, and another attempt has been made recently. There are upwards of forty silk-producing moths in different parts of the world. Night-moths form egg-shaped cocoons of a white colour, smooth, and silky, among branches of trees and shrubs, some of them being very large.

Stinging Caterpillars.—One of the most annoying of the insect torments of Ceylon are the hairy caterpillars of the tulip trees, who let themselves down by threads of gossamer which

¹ J. Entom. S., 1872.

² There is an account of the Assam moths in P. Z. S., 1859.

³ Georg. lib. ii. ver. 120.

they spin from the branches, on the neck, ears, or hands of a person underneath, shooting the stout hairs with which they are covered into the skin, causing considerable pain and inflammation for some time after. It is not exactly known to what species of moth or butterfly the hairy caterpillar of the tulip trees belongs, but they are probably a variety of *Adolia*, of which there are several species in the island. *A. lubentina* is a white and reddish-winged butterfly, variegated with black, which produces a green caterpillar, spotted with red, and covered with strong hairs that sting formidably. The tulip-tree caterpillar resembles that of *Adolia acontica*, of Boisduval, which is a pale green, with a white stripe along the back. There is also *A. garuda*, *Amathusa phidippus*, and *Discophora celine*, which have stinging caterpillars. Can any of them be the rough caterpillars mentioned in Jeremiah, ch. li. 27? Some of Reaumur's *Geometra* also let themselves down from trees by threads, but they are not hairy, and have no legs in the centre of their bodies, moving like leeches.

Geoffroy's *Pterophorus* are very abundant, minute night-moths named from the Greek for a feather, their wings being split into a number of feather-like portions; hence they are also called split-winged moths.

The most singular of all the moths belong to the family *Eumenidae*, of Westwood, genus *Oiketicus*. They form nests made of little bits of sticks fastened together lengthways, and lined with a silky substance; some of them are six inches long, and hang from branches of trees, looking like diminutive bundles of fire-wood. "The Sinhalese believe these moths were formerly human beings who have been condemned to this state as a punishment for stealing wood."¹ Some of this family of moth named *Psyche* are found in Europe, forming similar nests in pomegranate trees. Unlike most other insects whose transformations develope into a more perfect form, the female of the *Oiketicus* undergoes a gradual degradation, the wings and legs falling off, and ultimately becomes a vermifuge animal. The male and female live in separate nests. Four species of

¹ Tennent, Nat. Hist.

these insects were sent from Ceylon by Dr. Templeton, and described by Mr. Westwood in the P. Z. S., 1854, p. 219.

ORTHOPTERA. *Mantidæ*.—No form of the insect world is so strange as the leaf-insect; so closely do they resemble a leaf in shape and colour it is not easy to distinguish them among the foliage in which they live. Some are brown like a faded leaf, others are bright green of various hues. Naturalists divide *Mantidæ* into three classes—the ambulatory, or walking, who have very small wings, to which the *Mantis-religiosa* belongs; the *Phyllium siccifolium*, having large leafy wings; and the *Phasmidæ*, or spectres, also called stick insects, resembling in shape and colour a leafless twig, some being furnished with a short wing-like appendage, while others have only legs of a most attenuated form. There is also a sub-genus *Necroscia* with wings and bodies resembling dragon-flies, and richly coloured. The *Phyllium* and *Phasmidæ* are vegetarians, but the *Mantidæ* are ferocious and carnivorous, preying on the weaker members of their own sort, decapitating each other's heads in their strong jaws after fierce struggles, using their arms like swords. All the varieties are numerous in Ceylon; one, *Harpax signifer*, Walk., is exceedingly small, being only ten lines long.

Mantidæ are only found in tropical or very warm climates; one of the smaller species, *Mantis religiosa*, numerous in the south of France, at times holds its fore-arms in an attitude of prayer, which has given rise to strange superstitions among the peasantry, who supposed them able to divine events; hence the name of the soothsayer and praying-insects came to be applied to them. Sparman mentions that they are worshipped by the Hottentots; and the Mahometans say *Mantidæ*, like true believers, repeat their prayers with face and hands turned towards Mecca.¹

Their eggs are deposited on leaves, and look like seeds of an angular form with eight sides. *Mantidæ* in one stage of their existence inhabit a rough white egg-shaped cocoon resembling pith formed among branches of trees. Some of these

¹ Sparman, Travels; Blumenbach, Abbeld. Nat. Hist. Gigenstande, p. 88.

insects attain a gigantic size in South America and Australia, being more than a foot long, and very richly coloured. Several new *Phasmidæ*, sent from Ceylon by M. Nietner, are described in the "Linnean Transactions," 1866, 321, by H. W. Bates. *Vide* list at the end of this chapter.

Blattidæ.—The well-known nocturnal insect called the cockroach (*B. orientalis*) abounds in all the warmest parts of the island. In particular places about houses they come forth at night in thousands, and a light is indispensable in venturing among them. They are not so destructive in Ceylon as in England, where they are now naturalized, having been brought by ships.

Gryllidæ.—The common field-cricket (*Acheta campestris*), several varieties of grasshoppers and locusts (*Acridium*), are found in most parts of the island in great numbers, but it is quite free from the swarms which infest some parts of India.

NEUROPTERA.—*Dragon-flies* swarm in the hottest parts of the island, usually hovering over rivers and tanks; unlike most other insects, who generally avoid the mid-day sun, dragon-flies rejoice in its fiercest rays, their transparent wings sparkling in the sun with the lustre of gems. They are carnivorous, eating other insects, and also prey on their own species. Their enormous eyes see all around them; nothing escapes their observation, darting on passing insects with the velocity of lightning. The larvæ are also carnivorous, and in this state of their existence dwell either in or on the water, and are seen near the edges of rivers propelling themselves along by sucking in water at one end and forcing it out at the other.

The most beautiful of Ceylon dragon-flies is the *Euphæa splendens*, having a brilliant emerald hue. The colours of these insects fade rapidly after death, and many have no colour at any time, but only pale lace-like wings.

A variety of the dragon-fly (*Mymeleon*) produces a larva called the ant-lion, from its preying on ants, entrapping them in a circular pitfall in the sand, remaining partly concealed at the bottom, and eventually forms a cocoon of grains of sand cemented together.

Termites.—These insects are popularly but erroneously

called white ants, on account of the great resemblance between them and true ants (*Formicidæ*). White ants are classed by Westwood as the first of the order *Neuroptera* on account of their having four wings. It is also a mistake to suppose that they are all white, as there are many varieties of them in different countries, of varied colours, some being reddish and others quite black.¹ They were first noticed by Jobson in Purchas's "Collection of Voyages," and afterwards scientifically described by Smeathman in the "Philosophical Transactions," 1781.²

Typical white ants are mischievous little creatures, the colour of milk, and about half an inch long. Coming out of the ground they gradually cover everything they attack with cemented clay, and are very fond of wood, especially if it be old, but have no objection to clothes or other articles—furniture, mats, and in fact everything on the floors of houses require to be constantly examined to guard against them, for they work with such secrecy and celerity, articles are frequently destroyed before one has the least idea they are even touched. Timbers in the roofs of houses suffer very much from their depredations, and the ceilings are sometimes made of mats stretched on beams to facilitate examining them. The wooden posts of verandahs and doors require to be fixed into stone bases raised several inches above the ground to keep them off; ebony and palmyra are the only woods that defy them in Ceylon.

Colonel Yule, in his "Jordanus," gives a remarkable instance of their engineering talent: "Some harness was hung up on an iron peg in a wall so as to be at least six inches from it; but the ants were not to be foiled, they projected a tubular bridge of clay from a crack in the wall until they reached the harness."

It is not quite clear what they live on, although they eat great portion of the things they cover with clay. This is not always the case, as they erect ant-hills round trees which still

¹ *Vide* Hagen, List of *Neuroptera*, p. 20; *T. fatalis*, Fab., found in Ceylon, are a reddish brown, *T. taprobanes*, white.

² Friar Jordanus had previously to either written about them, but his work was little known.

flourish in their centre, and the inhabitants of these edifices must have some other way of obtaining food. Those who build round trees appear to be a distinct species, similar to Smeathman's *Termes arborum*, a brown colour, with black heads.

In the cinnamon gardens, Colombo, there are many of these ant-hills five or six feet high, full of cells and compartments communicating by means of galleries. Their habits in some respects resemble those of bees, having queens living in separate compartments, who swell to a monstrous size when full of eggs. Smeathman, whose observations were confined to African white ants, says a queen becomes two thousand times her natural size, and lays 2,920,000 eggs in a year. Schomburgk says the Savannahs of Guinea were covered with their fabrics ten feet high.

White ants swarm like bees at certain periods in the evenings, coming forth in such myriads as to darken the sky, being furnished with wings for the occasion, which drop off some hours after; they do not fly very far, but spread themselves over the vicinity of the parent ant-hill. (*Vide* ch. xxv. p. 147.) It is a subject of conjecture and surprise how they are able to secrete the quantity of gummy substance required to cement the clay of their immense habitations, or where they get all the moisture from. In the cinnamon gardens it is clear they must bring up the clay from some depth below, as the surface soil for several inches is composed of white quartz sand, which they do not use. The clay of their hills is triturated to an extraordinary degree of fineness. Knox mentions that it was used by native artificers for making moulds for small castings, and is still turned to the same purpose. *Termites* are not found in the higher mountains.

A writer in a recent number of the periodical called "Nature" (iii. 352), gives a description of the ravages of white ants in Jamestown, St. Helena, where they have effected a lodgment, having been previously unknown in the island. "Doors, roofs, floors, all eaten up; no wood but teak could defy them, and not always even that." The remnant of a doorpost in the governor's house is now in the British Museum. It is stated that the town of La Rochelle in France was at one

time in danger of a similar fate, some of these insects having been brought there in an American ship.¹

There is a statement in Pliny (xi. 81), taken from Herodotus, which has often puzzled commentators. He says, "There are in India a certain kind of ants who burrow in the earth and throw up abundance of fine gold from mines under ground. They are the colour of cats, and the size of Egyptian wolves." Query, does not this story refer to the great mounds of yellow clay reared by white ants, and have not they been confounded with the manis which burrows into them? Mr. Wilson, in the Jour. R. A. S., says there is a Sanskrit poem which describes some hill tribes on Mount Meru who used to sell grains of gold called "pippilaka," or ant gold, which they said was thrown up by ants. If Pliny knew this and the habits of the manis, it seems to explain his story. Some suppose it to refer to a practice of the natives between Thibet and India, who use foxes' skins for washing gold dust in. ("J. A. S. Beng." 1834.)

HYMENOPTERA.—*Ants* are the most numerous and ubiquitous of Ceylon insects, no place being free from their intrusion. A bit of bone or a shell hid away or even wrapped up in a drawer with any particle of flesh attached to it will be found, after a short time, quite polished. Skeletons of small reptiles are frequently found in holes about houses as clean as ivory, the work of the common black ants (*Formica nigra*) who are very useful in their way, performing the part of scavengers, and being endowed with a sleepless activity, are at work day and night carrying off dead or maimed beetles, cockroaches, and lizards. As soon as any of their numerous scouts perceive these lying about the house, they at once proceed to the nest, and in a few seconds a swarm comes forth and carries off the spoil. If you place a dead gecko on the floor in order to see this operation performed, you can trace the scouts to the nests, and remark almost immediately afterwards the issuing out of a swarm.

In consequence of their love for sweets,² places where these

¹ Annales des Sciences Nat., 1853.

² Dr. Davy, in an article on tropical plants, says that sugar-eating ants prefer brown to white sugar.

things are kept require to be isolated from the floors to prevent their intrusion, by placing the legs standing in saucers filled with water. Linschoten mentions this practice at Goa three centuries since, saying, "some have their bedsteads isolated" (p. 84).

Numerous as they are in the houses it is nothing to their numbers outside; they swarm in the sands, and cover every tree and plant from the roots to the extremity of the highest leaf. If you sit down for a few moments on the ground, or a seat, in a garden, you will find them immediately crawling over you; if you pluck a flower or a fruit you are sure to find them on it.

Jerdan¹ describes many species of ants of Southern India which are found in Ceylon; among them is a curious genus, *Harpegnathos saltator*, which jumps over the ground, making surprising leaps when alarmed; they prey on live insects. Every possible variety of size and shape present themselves, but are only of two colours, black or red;² the largest and least numerous is a very large black one, a species of *Ponera*, called "kalu-koombya" by the Sinhalese, rarely seen in houses or frequented places, but are found in the jungles living in holes in the earth, and bite formidably. The next in size are the large red ants (*Formica smaragdina* of Fabricius). They are fierce and active; it is no slight matter to get among a swarm of these irascible insects, who bite ferociously—the half-naked natives are in great dread of their painful sting. People are often obliged to beat a hasty retreat from the neighbourhood of their nests when passing through the jungles; if you only touch a branch of a tree where they are located, they at once attack you. Jerdan says, "they are employed in India to destroy wasps in their nests, but very often the remedy is worse than the disease, as they sting everybody in their vicinity." (*Vide* p. 229.)

It is said the Ceylon ants have no formic acid,³ which is a stinging liquid ants pour into a wound when they bite, but

¹ Annals N. Hist., 1854.

² M. Nietner "has sent seventy specimens of Ceylon ants, all of different species, to Berlin."—Tennent, Nat. Hist.

³ Tennent.

there seems to be no reason why they should not have it as well as all other ants. This liquid can now be produced by chemists, and has a sour smell and pungent taste. Red ants form nests with leaves of trees, which they glue together and then line with a thin substance resembling paper. In making them, several ants stretching from one leaf to another draw them together, holding them in their place while others fasten them.

Among the smaller ants is the *Formica nidificans*, which makes an oval nest, resembling paper, among branches of trees. As a general rule black ants made their habitations in the earth, and the red in trees. Some of the latter cover the hollows about the roots and trunks of trees in which they live with cemented clay. A very minute black species (*Atta minuta*), who prey on dead insects, make their nests in the backs of books, old papers, empty trunks, corners of drawers, and all sorts of places; they are often found on chatties and vessels containing water.

Black ants usually swarm at sunset, being provided with temporary wings. They are not all carnivorous; some species are vegetarians, eating seeds, while others are very partial to sweet substances.

Wasps and Bees.—There are several species of mason bees and wasps who make nests of an oval shape, composed of clay formed into cells similar to those of a beehive, suspended from the branches of trees, and are often of very large size, some having been found six feet in length, described by Mr. Whitehouse in the "Trans. Entom. Soc.," 1839.

A large species of hornet (*Sphex rufipennis*) of Fabricius, with reddish-brown wings, having violet reflections, is regarded by the natives with great dread, their bare skins rendering them peculiarly vulnerable to its ferocious sting, and is more than a match for the large Spider (*Mygale fasciata*), which it occasionally kills. Roberts says, "he has known natives who died from the effect of their sting, and thinks they are the formidable hornet alluded to in Scripture;¹ they prey on cockroaches caught in holes and crevices of walls.

¹ Roberts, *Oriental Illus.*, p. 109; "I will send hornets before thee."—Exod. xxiii. 28; Josh. xxiv. 12.

A small species of mason wasp of the genus *Pelopon*, with very lustrous wings, has a passion for filling keyholes of doors, crevices in posts, or any tubular article not constantly in use, with a series of clay cells,¹ in which they place their eggs, previously depositing them in the bodies of another insect, and then closing the aperture with clay. This wasp belongs to the numerous family of what are called solitary bees or wasps, who live separate, and do not congregate in hives. Some of them have the habit of depositing their eggs in the bodies of caterpillars or other soft insects, who are previously disabled by stinging them, the unlucky insects thus selected writhing terribly under the operation.

Carpenter bees (*Xylocopa*) another of the solitary family, resemble honey bees, but are more hairy and thicker about the body and legs; a very common variety in Ceylon has violet coloured wings and a black body, as their name implies. They bore holes in wood for depositing their eggs in, afterwards closing the aperture with the dust of the wood cemented with a secretion. It is a curious circumstance that the head of the young pupæ is always found to be next this part, which they can easily penetrate when the time arrives for their exit; the boring of the holes is performed while they are poised on their wings, and accompanied by a humming noise. They are very fond of making holes in the posts of doors and verandahs of houses.

Honey bees are abundant. A great quantity of wild honey is found in the hollows of trees in the jungles, and hawked round Colombo for sale by the natives.

HOMOPTERA.—*Cicadidæ*, or tree crickets, abound in the warmer parts of the island; their loud and harsh notes predominate in the gardens and jungles over the varied noises of all other insects; but they are seldom seen and not easily caught, their tune suddenly ceasing the moment you approach the vicinity from whence it proceeds. The very great power of voice in this insect in proportion to its size has been often commented on, and is supposed by some naturalists to rest in the abdomen. Anacreon, who calls it the "melodious insect,"

¹ A variety called "*Pelopon nid en tube*" by the French is found in Italy.

has made it the subject of Ode xxxiv. Plato was compared to one on account of his eloquence; and it is mentioned in Homer's "Iliad." The elder D'Israeli, in his "Essay on Romance,"¹ calls it the insect *Haifdel*. The field cricket and grasshopper have been often mistaken for the *Cicada*, which has a very thick body with a broad head and large prominent eyes; they have also very large transparent wings, are very fond of the sun, and lay their eggs in crevices of the bark of trees.

HEMPTERA.—There are a great number and variety of insects in the tropics included in this general term, presenting all sorts of queer shapes, among them are the *Hydrometridæ*, or water scorpions, frequenting the surface of rivers, tanks, and aquatic plants; some have wings, and fly into rooms at night, others resemble water beetles; and there is a gigantic aquatic bug (*Belostoma Indicum*), about three inches long, of a brown colour, also found in India, which bites ferociously when laid hold of.

APHANIPTERA.—*Fleas* swarm in the sands, but are not very numerous in houses, unless they are neglected. If a house is unoccupied for any time it is necessary to wash the brick floors before a person can enter, if he does not wish to be covered by thousands of them.

DIPTERA.—In consequence of the heat and abundance of moisture, prodigious swarms of flies of various species infest most parts of the island; the oil in the tumblers² of night-lights in bedrooms is usually found full of them in the morning, and the light is often put out by the numbers that surround it. They are most numerous along the banks of rivers and tanks, rising from them in dense clouds during the evenings, particularly after the monsoons. The houses in the vicinity of the lakes at Colombo are infested from this circumstance.

¹ *Vide* Moore's "Anacreon," where many quotations will be found on this subject. The cicada is evidently the insect alluded to, and not the grasshopper. The latter was a symbol of initiation in the ancient Egyptian mysteries.

² Some years since the light in common use for all purposes in the island was a short cotton wick fixed in the centre of two bits of cocoa-nut leaf fibre placed crossways, with little bits of cork at their ends. This floated on cocoa-nut oil in an ordinary tumbler half-filled with water. These ingenious and primitive lights were made by the servants.

Mosquitoes (*Culex laniger*) are perhaps the greatest torment in Ceylon; new arrivals are especially victimised, and easily recognised by the extra number hovering about them, perhaps from their blood being sweeter than the older habitués, who are less annoyed the longer they remain in the island. Natives are rarely bitten by mosquitoes; but, as they oil their skins, it may keep them off. The clothes worn by the Europeans are no protection from their bites, as they can insert their proboscis through the stoutest cotton or drill trousers, and are so active you cannot catch them unless when gorged with blood.

Mosquito curtains to beds are indispensable; thus enclosed in a cage of muslin you may defy them, but if only one is left inside you cannot rest until he is got out, as he will alight on your face in the most irritating manner every time you are dropping to sleep.

Herodotus says, "the fishermen in the fens and swamps of Egypt covered themselves when sleeping with their fishing-nets, knowing that the mosquitoes would not venture through the meshes of a net." But as Sir E. Tennent remarks, in quoting this passage, "the mosquitoes of Ceylon are 'uninfluenced by the same considerations which restrained those of the Nile.'" Fortune says, "mosquitoes in China, where they appear to be very numerous, are kept off by what the Chinese call Mosquito tobacco, or pastilles made of the resinous wood of juniper trees" (p. 180).

A very pretty fly, of a bright green colour, is named by the Europeans the flying bug, from its being impregnated with a very strong odour similar to that of the domestic insect; they have some resemblance to cantharides, and are very common in gardens about Colombo. Any naturalist enamoured of its appearance, who catches one, will find out that this insect deserves the name given it, and will never try to entrap another. Dr. Hooker mentions these flying bugs in his "Himalayan Journal" (p. 74).

Nycteribia.—A very extraordinary parasite, found on bats in Europe, has also been noticed on them in Ceylon. This insect, which seems to be allied to the *Hippoboscidae*, or spider-

fly, that torments horses, but cannot fly like them, was first described by Montague in the "Trans. of the Linn. Soc." in the early part of this century.¹

Coccideæ.—An insect that causes great damage to coffee trees in Ceylon is called the coffee bug, *Lecanium coffeæ*, but it belongs to the family of scale insects, one of whom, the *Coccus lacca*, produces the shell lac or gum lac of Japan, a rich transparent brown gum which exudes from it in the form of scales, being in reality the larvæ of the insect; another furnishes the cochineal dye.

The coffee bug first appears in the form of minute brown wart-like bodies on the bark of the young shoots, each wart is a female containing a number of eggs; when arrived at maturity the young come forth, looking like exceedingly small woodlice, speedily spreading themselves over the whole plant, which then presents the appearance of having a pale scaly eruption on the bark. "It is only after the pest has been on an estate for two or three years, that it shows itself to an alarming extent. With the second year the trees assume a blighted appearance, and the berries turn black, numbers falling off; the third year the whole plant becomes black as if covered with soot, the leaves looking like velvet, and on many trees there is not a single berry."² No effectual remedy appears to have been discovered for this pest, which is to some extent mysterious in its visitations, appearing and disappearing on the plantations at intervals of several years; both black and red ants prey on the larvæ, and the larger species of red ants already described were encouraged on some estates, in the hope that they would exterminate it, but the remedy was found as bad as the disease, for the ants drove away the Malabar coolies, who could not stand their ferocious sting. The coffee bug undergoes several transformations, the mature insect has something of the appearance of a fly, having two oval wings and six legs, the body is long, with a tail formed of a single seta. The female has no wings, and when full of eggs, of a flat round

¹ Vol. ix. p. 166; vol. xi. p. 11.

² Dr. Gardner, Mem. on the Coffee Bug. The coffee plants in Guadaloupe have been injured by an insect named *Elachista coffula*.—Kirby, p. 109.

form. The young are quite microscopic. *Something similar is at times found on vine stems in England.

ARTICULATA.—*Acarida*. Ceylon is infested with ticks of varied size and colour, *Oribata* and *Ixodes*, the larger species similar to those of England, are of course exceedingly numerous in such a climate, crows, shrikes and other birds pick them off the backs of buffaloes and cattle, but the dogs are not so lucky; the wretched pariah curs of the native villages are perfect martyrs to these insects, who sagaciously fasten themselves on those parts of the animal where he cannot reach them. Even man comes in for his share of the pest, a small species of mite like grains of dark sand swarm in the lower jungles, where a number of the tormenting vermin will at times get on to every part of your body. Mites are common to all tropical climates, and are not confined to the jungles, being found in gardens and houses about Colombo; they are exceedingly small and burrow under the skin, holding on so tenaciously, the head often remains in the wound when you pull them off, and with some persons causes considerable inflammation. They should be touched with a drop of cocoa-nut oil, when they speedily fall off without any further annoyance. Cocoa-nut oil is very obnoxious to most insects, and the best remedy for their bites or stings.

A species of *Trombidium*,¹ looking like a ball of crimson velvet, about half an inch in diameter, swarm in thousands on the sands in some places soon after heavy rain, chiefly in the north; they are full of a red fluid, and quite harmless, living on vegetation. A small variety called the red mite is found in gardens in England.

Scorpions, although numerous, are not very troublesome or dangerous in Ceylon; they are less common at Colombo than Kandy and other places, where there is a very large black species, *Buthus afer*, and a smaller yellow one, *Scorpio Ceylanicus*. There are also others of a dark gray colour. Dr. Davy, who made some experiments on fowls, found they were not much affected by their sting, and came to the conclusion that it was little more active than that of a wasp. "And the same with

¹ Trombidea, Snites & Buffon.

centipeds and spiders," but centipeds will cause a good deal of inflammation at times. In some parts of Italy where scorpions are very venomous, it is said¹ the best remedy for their sting is to crush the insect and place it on the wound, and an oil was manufactured from them for the same purpose. The habits of scorpions are similar to those of centipeds, being partly nocturnal, and eating cockroaches; the female carries her young, who are of a very pale colour, on her back.

Chelifer.—Three species have been noticed in the island by Dr. Templeton, one being similar to a European variety, and probably imported in books by the Dutch or Portuguese. The *chelifer* is an active and minute insect resembling a scorpion, with a crab-like claw, and called the book scorpion from its being always found about old books and musty papers, preying on the microscopic forms which constitute the mould on paper kept in damp or neglected places.

Another insect found in the same places is named the *Lepisma* and fish insect, from its silvery scaly appearance, and easily recognised by the peculiar tail formed by three long setæ placed at an acute angle. One of them found in Ceylon is also said to have been brought from Europe.²

Arachnide.—Two or three very large species of spiders are found in the island; one of them which is very common, belongs to the family of *Impavida*, and is described by Walckenaer,³ who calls it *Olios Taprobanus*. It is about fifteen lines long, of a dark gray colour, having little hair on the body and very long legs, the corselet is reddish, and it spins a very strong web. Walckenaer says it resembles the *Olios* of the Moluccas, which is remarkable for its long legs, but is paler in colour.

These spiders are occasionally seen running across a room carrying a cocoon full of young ones under their legs, which they drop when hotly pursued, the little ones running about in all directions in wild dismay.⁴ It was the custom among the Europeans in the island to kill all of them they could find,

¹ Mignon, Travels.

² Tennent, i. 155; Van Hoveen, Zoology.

³ Walckenaer, Suites à Buffon, i. 590.

⁴ Buffon says, "In very hot climates some of the egg sacks of spiders contain

from the erroneous idea that their bite was poisonous, being mistaken for the venomous *Tarantula* found only in Italy. There are some species of *Tarantulæ* in Ceylon, but they are small and harmless. The *Olios* are frequently found in cellars among wine or beer bottles.

The largest spider in the island is the *Mygale fasciata*,¹ a very large insect, spreading its legs over a diameter of from six to eight inches; the body and legs are stoutly made and covered with long dark brown hair which gives it a very heavy aspect. This spider is slow in its movements, and is said to have retractile claws like feline animals.² Knox, who named it "Democulo," says it was as large as a man's hand.

The *Mygale* is more common in the northern parts of Ceylon, but is not very numerous anywhere, and its habits are solitary and retiring, being seldom seen in the day time, living on small insects and cockroaches.

Some have supposed the *Mygale* to live in trees, and spin a web strong enough to catch small birds,³ but in no instance has it ever been known in Ceylon to prey on them, nor does it appear to live in trees, or spin a web anywhere, for it catches its prey, such as cockroaches, by openly attacking and seizing them on the ground. Albert Seba says, "it does not make a web, although it lets itself down from trees where they live, by a strong thread."⁴

There has been some controversy about the bird-eating propensities of the *Mygale aricularia* of the West Indies, very closely resembling that of Ceylon, and stated by Madame Merian to prey on sun birds in Surinam, but the truth of her statement has been questioned; however it is said there are bird-eating spiders in Brazil, Sydney and India. In the

more than 800 young; Lieut. Hutton counted 310 in one, J. A. S. Beng., 1832, p. 474.

¹ Walckenaer, i. 209.

² Lucas in Ann. Nat. Hist., new series, i. 159.

³ Capt. Percival says, "There is a spider which makes a web strong enough to catch a bird," Ceylon, p. 313.

⁴ Seba calls it the *Aranæa maxima Ceylonica*. "Cette espèce ne fil point de toile, il se trouve sur les grandes arbres." Mr. Layard, C. C. S., gives an account of a fight between a mygale and a cockroach, Ann. Nat. Hist., 1853, p. 392.

Annals of Nat. Hist. for 1851, there is an account by Captain Sherwell, of an immense web of a yellow colour some twenty feet wide, found near Kerrakpur on the Ganges, formed by a large black and red spider six inches across the legs, supposed to be an *Epeira*. The partly eaten remains of a *Nectarinia Asiatica* were hanging to the web.¹ Other accounts have been published of voracious and carnivorous spiders called *Galeodes*, observed by Captain Hutton,² at Neemuch, who appear to live on the ground and not to spin a web. None of these tigers of the insect world have been noticed in Ceylon. Du Chaillu also speaks of spiders' webs in Africa so strong that birds were entrapped in them.³

There are many varieties of the true spider or *Arachnida* in Ceylon, such as the *Epeira diadema*, which resemble those of Europe in appearance, haunts, and habits, suspending their graceful webs in houses, gardens, and jungles, from branches and stems of trees across paths and other places in hope of intercepting flies and insects, just as we see them in England, with the shrivelled bodies, limbs, and wings of their prey hanging from them; they are, however, much larger than those of Europe, and spin amazingly strong webs. Dr. Hooker mentions seeing "spiders' webs in Benares resembling curtains of coarse muslin, several yards across; the threads were not arranged in radii, but like those of weavers" (p. 66). The spiders we have been describing all bear a resemblance to those of Europe, but there are in the island several species of *Gasteracantha*, of a pale colour and small size, with strange spikes and projections on their bodies. Some of these eccentric forms, along with curious new spiders, in the Hope Museum, Oxford, recently sent from Ceylon by Mr. Thwaites and M. Nietner, are described by the Rev. O. P. Cambridge in the Journal of the Linnean Society for 1870. One, named *Phoroncida Thwaitesii*, two and a half lines long, and of a reddish colour, belongs to the family of *Therididion*, established some

¹ Also in J. A. S. Beng., xix. 475.

² J. A. S. Beng., xi. 860.

³ "Le pays est plein d'araignées d'une étonnante variété de formes. Quelques-unes de la grosse espèce, ont des toiles si fortes que des oiseaux même viennent s'y prendre."—Nou. Annales de Voyage, Paris, 1868, p. 97.

years since by Mr. Westwood on the receipt of a variety from Malabar. Another is "a veritable four-eyed spider" (*Miagrammopes*), the first ever found, although the existence somewhere of such a spider has been long suspected by naturalists, as it fills up a gap in these insects; all spiders hitherto known having either two, six, or eight eyes. They are very small, only four lines long, of a yellow colour, and also remarkable for the great length of their first pair of legs, which are quite disproportionate to the others.¹ The most remarkable of all are the eyeless spiders, which will form a new family called *Tartarides*, closely allied to *Thelyphonus*, already found in the island. These blind spiders, of which two varieties have been named *Nyctalops crassicaudata* and *N. tenuicaudata*, are minute arachnids found among decayed leaves on the ground; they are of a yellow brown colour, and have a sort of tail.

The immensely long-legged spiders (*Phalangium*), called harvest men in England, are found in the higher mountains.²

Spiders are said to have been a favourite food of Anna Maria von Schurman, a German poetess connected with the so-called Reformers of the sixteenth century; she compared them to nuts. They were also eaten by Laland the astronomer. Walckenaer mentions several instances of this singular fancy in France and elsewhere, and their supposed medicinal properties. They were used by Galen for diseases of the eyes, and formed part of the recipes of Sir Walter Raleigh, a secret acquired in South America.³

• MYRIAPODA.—As in most hot climates there are many varieties of insects, large and small, resembling centipeds, such as *Lithobius* and *Geophilidae*, often mistaken for true centipeds or *Scolopendra*, which are less numerous than the other species. Many of the *Myriapoda* are of a pale red colour, and some are olive brown. They are all covered with a number of horny scales or plates, forming a sort of armour, which in the larger species is exceedingly hard and strong, resisting a good blow.

¹ A variety has been found quite recently in Northern Australia.—Ann. Nat. Hist., 1874, p. 169.

² Tennent.

³ Walckenaer, i. 181

Some of the *Scolopendra* are of large size, being twelve inches long, and quite nocturnal in their habits, having an apparent objection to the light, dwelling in dark damp holes of walls and cellars, or amongst old timber, and are often found in bundles of fire-wood. They have an unpleasant habit of secreting themselves in the sleeves and pockets of clothes, which necessitates an examination of articles of dress that have been placed aside for any time before putting them on. Centipeds are inclined to be pugnacious, and when first seen raise the fore part of their bodies in a menacing attitude, but speedily take to flight and run with great rapidity. They are possessed of an extraordinary activity, which, together with their defensive armour, enables them often to escape with impunity from the ill-directed blows aimed at them.

There is something very unpleasant in the aspect of these creatures, every bit of whose jointed bodies and numerous legs are in active motion at the same time, and the bare idea of their crawling over one is horrible. Their bite is also very painful, producing a great deal of swelling and redness for some hours. They are supposed to secrete a poison, which is soon exhausted by use. A variety named *Cermatia* is remarkable for the great length of its slender legs and antennæ.

Millepeds, though allied to centipeds, do not possess either their unpleasant properties or activity, being quite harmless, and are generally found coiled up in a state of torpor, only moving about in very hot weather, and are vegetarians. These insects resemble a coil-spring of fine wire about eight inches long, of a dark colour. One species of *Julus* has a red stripe along the back; their legs, which are yellow, are not so numerous as the name millepede implies, being only about one hundred in number. They progress very slowly, with an undulating movement, and are very numerous in the gardens about Colombo.

Glomeris.—Woodlice are abundant; among them is a very pretty species of *Zephronia*, of a brilliant yellow colour, with dark bands, green antennæ and legs. Woodlice are called pill millipeds, from their habit of rolling themselves into a round ball when touched.

ANNELIDÆ.—*Leeches* infest both land and water. A variety of the medical leech (*Hirulo medicinalis*),¹ and a cattle-leech swarm in all the unfrequented lakes and waters. When leeches were wanted medicinally, instead of sending to an apothecary for them, it was the custom to send a native with a bottle to catch some by wading into the water of the nearest swamp, and take them off his legs as they fastened on him. They are very large, and have an immense capacity for blood, in which they are out-done by the cattle leech (*Hæmopsis paludum*). “The cause of much annoyance, and even the death of cattle and other animals who go to drink in places frequented by them. These pests, hidden in the vegetation which fringes the water, fasten themselves on the animals, and making their way up the nostrils, are not to be eradicated until they drop off gorged with blood, when the internal hæmorrhage sometimes suffocates the animal.”²

Land leeches (*Hæmadipsa Ceylanica*) to sportsmen and persons who frequent the damp jungles of the interior, are the greatest pests in Ceylon. Leech-gaiters, which keep the others off, are of little avail against them, as they climb up your body and get inside your clothes; besides, they can spring on you from among the leaves.³ They are of a reddish brown colour, with a narrow yellow stripe on each side, and are not much thicker than a large needle when empty, but when filled with blood they swell to the size of a goosequill one or two inches long. The young ones can hardly be seen, as they are no larger than stout hairs; they are not found in tanks or rivers, their usual haunts being damp vegetation, yet appear to have the power of living for some time without moisture, as a shower of rain has the effect of bringing them forth by thousands in places where not one could be observed before. They have driven travellers out of the Rest-house at Kaigalle to take shelter on the road, and have been known to draw blood from people in their palanquin carriage.

¹ *Hirudo sanguisorba*, Linn.

² Tennent, Nat. Hist.

³ The land leeches of Ceylon were described in the Edinburgh Philo. Trans., 1826.

With persons whose blood is in a bad state their bites when numerous will produce dangerous sores. Dr. Davy (p. 103) mentions that "many of the sepoy and coolies employed in the Kandyan rebellion of 1818 died from their effects, leeches causing more deaths than snakes, and he had seen fifty on a man's leg at a time." The best way to make them drop off is to squeeze lime-juice on them, a remedy mentioned by Ibn Batuta, who seems to have been the first writer who noticed them.¹ Coolies and natives employed in jungles where they are numerous and much exposed to their attack from their bare legs, smear them with cocoa-nut oil. When looking out for prey they congregate by thousands in damp vegetation with one end of their bodies fixed on the leaves and the other end raised perpendicularly in the air, waving backwards and forwards.

Sir E. Tennent, who had some of them examined through a microscope, says the body is formed of a hundred rings, and they have five pairs of eyes, which are placed on the dorsal surface of the first five rings, two on each. The teeth, which are sharp and pointed, are very numerous and arranged in rows. The mouth is similar to the water-leach; neither eyes nor teeth are perceptible to the naked eye. Land-leeches were found by Thunberg in Batavia, by Marsden in Sumatra, and by Dr. Hooker in the Himalaya. They have been also noticed in Japan and Chili.²

A gigantic species of earth worm (*Megascolex coruleus*, Parag.) upwards of twenty inches long, and of proportionate thickness, which throws up great hillocks of mould, is very common in the north-eastern provinces. They were first described and named by Dr. Templeton in the P.Z.S., 1844. Sir E. Tennent in a letter to the same society, 1862, implies that they were not unknown to French naturalists, and refers to D'Orbigny, but his account was taken from Dr. Templeton; he says, "*Megascolex*, genre de la famille des lombries nouvellement établi par M. Templeton pour une grande espèce qu'il a découverte dans l'île de Ceylon," viii. Ed. 1846.

Filaria.—An exceedingly fine kind of worm called the guinea

¹ Vide ch. xii.

² Hooker's Journ., p. 98.

worm (*Filaria medinensis*) is not uncommon in Ceylon among the natives, chiefly in the north, generally forming under the skin about the ankles. Some suppose it is introduced into the system through the water, while others think they are in the sand, crawling up the feet and legs and working their way under the skin. It is at first very short and barely perceptible to the eye, but grows to a great length, circling round and round into the flesh. It has recently been ascertained to be oviparous, although this was doubted, and appears to be a species of tape-worm, or very closely allied to them, growing in the same manner.

They are found in India, and Linschoten mentions a similar worm at Ormus, saying, "There is a sickness or common plague of worms which grow in the legs; it is thought they proceed from the water that they drink. These worms are like unto lute-strings, and two or three fathoms long, which they must pluck out and wind about a straw or a pin every day some part thereof as long as they feel them creeping. It is also called the oxen pain, because oxen are many times grieved with them."¹ The guinea worm was known to Agatharchides. There is a long account of it in the Trans. Linn. Soc., 1864, by Dr. Charlton.

¹ Travels, p. 16.

LIST OF INSECTS.

The difficulties in the way of making a list of all the Ceylon insects already known are very great, and if accomplished it would be too voluminous to insert here. The following chiefly new or remarkable species are taken from various "periodicals" and works on natural history.

ARTICULATA.	
• Arachnidae.	
<i>Mygale fasciata</i> , Walck.	<i>Cheriacanthum incertum</i> , Camb., N.
<i>radialis</i> , Camb., new species.	<i>Tenganaria civilis</i> , Sum.
<i>Phrynus lunatus</i> , Pall.	<i>torva</i> , N. S.
<i>Thelyphonus caudatus</i> , Linn.	<i>Pholcus Ceylonicus</i> , N. S.
<i>Olios taprobanus</i> , Walck.	<i>distinctus</i> , N. S.
<i>Amycle albomaculata</i> , Camb.	<i>Argyrodes fissifrons</i> , N. S.
	<i>Theridion tepidariorum</i> , Koch.
	<i>lutipes</i> , Camb.

- Theridion annulipes*, N. S.
spiniventris, N. S.
Dolichognatha Nietneri, N. S.
Tetragnatha decorata, Bl.
culta, N. S.
argentula, N. S.
Ceylonica, N. S.
Phoroncida Thwaitesii, N. S.
Nyctalops crassicaudata, N. S.
tenuicaudata, N. S.
Phalangium.
Scorpiidae.
Buthus afer, Linn.
Scorpio Ceylanicus, Herbst.
Chelifer librorum, Temp.
Myriapoda.
Cermatia.
Heterostoma spinosum, Newp.
Scolopendra Ceylonensis, Newp.
flava, Newp.
crassa, Temp.
pallipes, Temp.
tuberculideus, Newp.
Julus.
Zephronia.
Lepisma aurofasciata, Temp., T. E. S.,
 iii. 30.
Mantidae.
Lonchodes flavicomus, Bates.
- Lonchodes grillator*, Bates.
furcatus, Bates.
denticauda, Bates.
asculator, Bates.
Necrosia junus, Bates.
tenebrosa, Bates.
acutipennis, Bates.
Bacillus scytale, Bates.
Humberti, Bates.
Harpax signifer, Walk.
Phyllium siccifolium.
curifolium, Fab.
Mantis siccifolia, Fab.
superstitiosa, Fab.
Oiketicus.
Psyche Doubledii, Westw.
Metisa plana, Westw.
Eumeta Cranmerii, Westw.
Templetonii, Westw.
 • *ANNELIDA*.
Hirudo sanguisorba, Linn.
Thwaitesii, N. S.
Hæmopsis paludum.
Hæmadipsa Ceylana, Blain.
Lumbricus.
Megascolex cæruleus, Temp.
Filaria.
Filuria medicensis.

The following families and genera of other insects are said to be found in the island.

COLEOPTERA.		
cicindelidæ	dermestidæ	elateridæ
carabidæ	byrrhidæ	lampyridæ
paussidæ	histeridæ	telephoridæ
dytiscidæ	aphodidæ	cebionidæ
gyrinidæ	trogidæ	melyridæ
staphilinidæ	copridæ	cleridæ
pselaphidæ	dynastidæ	ptinidæ
scydmænidæ	geotrupidæ	tenebrionidæ
ptilidæ	melolonthidæ	opatridæ
nitidulidæ	cetoniadæ	helopidæ
colydiadæ	trichiadæ	meloidæ
trogositidæ	lucanidæ	colemeridæ
cucujidæ	passalidæ	mordellidæ
phalacridæ	sphæroididæ	anthicidæ
lathridianæ	hydrophilidæ	cissidæ
	buprestidæ	tomicidæ

curculionidæ
 prionidæ
 cerambycidæ
 lamidæ
 hispidæ
 cassididæ
 sagridæ
 donacidæ
 eumolpidæ
 cryptocephalidæ
 chrysomelidæ
 galerucidæ
 coccinellidæ
 erotylidæ
 endomychidæ
 trigonotomidæ
 diaperidæ
 anthribidæ
 lyttidæ
 bembidiidæ

LEPIDOPTERA.

papilionidæ
 nymphalidæ
 lycanidæ
 hesperidæ
 sphingidæ
 castnidæ
 zygenidæ
 lithosiidæ
 arctiidæ
 liparidæ
 psychidæ
 notodontidæ
 limacoidæ
 drepanulidæ
 saturinidæ
 bombycidæ
 cossidæ
 hepialidæ
 cymatophoridæ
 bryophilidæ
 elucanidæ
 glottulidæ
 apamidæ
 caradrinidæ
 noctuidæ
 hadenidæ
 xylindæ
 heliothidæ

hæmerosidæ
 bombycoidæ
 anthophilidæ
 euiopidæ
 enrhpidæ
 plusiidæ
 calpidæ
 hemiceridæ
 hyblæidæ
 gonopteridæ
 toxocampidæ
 asopidæ
 hypogrammidæ
 catephidæ
 hypocalidæ
 homopteridæ
 catocalidæ
 ophideridæ
 erebidæ
 ommatophoridæ
 hypopyridæ
 bendidæ
 ophiuridæ
 enclididæ
 remigidæ
 focillidæ
 amphiganidæ
 thermisidæ
 urapterydæ
 ennomidæ
 boarmidæ
 geometridæ
 palyadæ
 ephyridæ
 acidalidæ
 micronidæ
 larentidæ
 platydæ
 hypenidæ
 herminidæ
 pyralidæ
 ennychidæ
 hydrocampidæ
 spilomelidæ
 botydæ
 scoparidæ
 choreutidæ
 phycidæ
 crambidæ
 chloephoridæ

tortricidæ
 yponomeutidæ
 gelichidæ
 glyphiptidæ
 lyonetidæ
 tineidæ
 pterophoridæ
 margarodidæ

ORTHOPTERA.

forficulidæ
 blattidæ
 phasmidæ
 necrosiæ
 gryllidæ

PHYSAPODA.

phæothrips

NEUROPTERA.

sericostomidæ
 leptoceridæ
 psychomidæ
 hydropsychidæ
 rhyacophilidæ
 perlidæ
 siliadæ
 hemerobidæ
 myrmeleonidæ
 psocidæ
 termetidæ
 embidæ
 ephemeridæ
 libellulidæ

HYMENOPTERA.

formicidæ
 ponericidæ
 mutillidæ
 eumenidæ
 crabronidæ
 sphegidæ
 larridæ
 pompilidæ
 apidæ
 chrysidæ
 ichneumonidæ
 braconidæ
 chalcidæ
 diaphridæ

DIPTERA.

mycetophilidæ
 cecidomyzidæ
 simuliidæ
 chironomidæ
 culicidæ
 tipulidæ
 stratiomidæ
 tabanidæ
 asilidæ
 dolichopidæ
 muscidæ
 nycteribidæ

HEMIPTERA.

pachycoridæ
 eurygasteridæ

plataspidæ
 halydidæ
 pentatomidæ
 edessidæ
 phyllocephalidæ
 mictidæ
 anisoscelidæ
 alydidæ
 stenocephalidæ
 coreidæ
 lygaidæ
 aradidæ
 tingidæ
 cimicidæ
 reduvidæ
 hydrometridæ
 nepidæ

notonectidæ

HOMOPTERA.

cicadidæ
 fulgoridæ
 cixiidæ
 issidæ
 derbidæ
 flattidæ
 membracidæ
 cercopidæ
 tettegoniidæ
 scaridæ
 iassidæ
 psyllidæ
 coccidæ

Condensed from Sir E. Tennent's list and the Ann. Nat. His., a few of the names being expunged and others added ; some of them are given doubtfully.

CHAPTER XXVIII.

FISH.

THE seas round Ceylon swarm with an almost endless variety of the finny tribe, presenting many strange and fantastic shapes, nature in their formation revelling in every imaginable eccentricity of form and beauty of colour. To most persons fish are an uninteresting study, yet as Brillat Savarin remarks, they are 'relics of the ancient world, "truly antediluvian creatures surviving the mighty cataclysm which drowned our ancestors in the eighteenth century of the world, to them a time of joy and festivity."'¹

Many Ceylon fish were described by Valentyn, Ruysch, Block, Commerson, Sonnerat, L. Gronovius, and others, their descriptions being subsequently incorporated in Cuvier's and Valenciennes' great work, containing in addition an account of many new specimens supplied by Reynaud, doctor of the French corvette *Cherrette*, some time in Ceylon, Leschenault, and various travellers. In 1830 Mr. Bennet, a retired civil servant of Ceylon, published an account of thirty of the most remarkable of those caught about the island. Since then several collections have been made by Dr. Kelaart, Bleeker, and others, the whole of which are described in Dr. Günther's work on fish, enumerating 6843 species from all parts of the world, published by order of the trustees of the British Museum between 1859 and 1870. Cuvier and Valenciennes only described 777 species. The total number of the finny tribe in the world is supposed to be about 9000, and the British Museum contains 5177 specimens.²

¹ Physiologie du Gout, p. 70.

² Günther, viii. pref. vi.

The real number of fish about Ceylon is not well known. Sir E. Tennent says "a collection of 600 drawings made in the island was submitted to Professor Huxley, but he did not consider it certain they were all distinct species, if so, it is the largest amount from any one locality in existence—even the Chinese and Japan seas have not yet yielded 800 species. Specific distinctions of fish cannot be discerned from drawings, their characters being made out from fins, rays, teeth, and operculum. The number of British fish is about 250, those of the Coromandel 200, and the Malay Archipelago 238."¹

The number of names given to each fish by naturalists and their arrangement in groups or families is very perplexing, no two naturalists agreeing on this point. The sizes and colours of fish also vary considerably, which must be taken into account when reading descriptions of them, two persons describing the same fish giving very different tints.

Fish are usually divided into two great families: ACANTHOPTERYGII, or spine-finned fish, and CARTILAGINOUS fish, named from the large amount of cartilage in their skeletons, forming soft and flexible rays, comprising sharks and rays.

BERYCIDÆ.—The large Red Sea perch (*Holocentrum ruber*, Benn.¹) called "ratto-pahaya" by the Sinhalese, about two feet long, of a bright red colour tinged with gold, is occasionally caught on the southern coast, but only eaten by the natives. *H. diadem*, Lacep. is a much smaller variety. Most of the *Berycidæ* have large eyes and a flattish body; some have thorny spikes projecting from their fins, as in the very curious single thorn fish of Japan (*Monocentrus Japonicus*).

PERCIDÆ.—The genus *Serranus*,² named from having a serrated operculum, are a beautiful family of perch with varied and bright colours. Among them may be named *S. Sonnerati*, a fine red with blue markings; and *S. marginalis*, half a pale red and half yellow; *S. flavoceruleus* has a slate-coloured body, ending in blue near the tail, which with the fins is yellow. This is Bennet's *Perca flavopurpurea*, "kaha-laweyha" of the Sinhalese, a scarce fish, found in deep water, and considered

¹ Tennent, i. 231.

² The smooth *Serranus* is sometimes caught off Cornwall.—Yarrell, vol. i.

good. The *Diacopes* are a dark-coloured family of perch, some being more blue than others; *D. spilura* is a reddish purple. Some of the *Lobotes* of Cuvier have been called the black perch from their dark colours; those found in Ceylon are a brownish grey. *Mesoprion aurolineatus*, another genus of perch, is an olive-green with four golden lines on each side. *Dentix furcosius* is an oval-shaped fish of a pinkish colour. This genus is so named from having three or four long teeth. The four-toothed sparus (*Dentix vulgaris*) is caught on the coasts of England, a large size sometimes weighing 20lbs.

MULLIDÆ.—Several species of mullet similar to those of Europe are found in the island, and one peculiar to it (*Mulloidés Zeylonicus*), which has barbels; the colour is a carmine red mixed with yellow. *Mulloidés cinnabarinus*, found about Trincomalee, is scarlet, and *Upeneus vittatus* is like the rayed or striped sur-mullet of Europe; the flesh of all is considered good. Mulletts were held in high estimation by Roman epicures, and fabulous prices given for them (Pliny, ix. 18).

SPARIDÆ.—*Lethrinus erythrurus*, an oval fish of a greenish colour, about six inches long, is a species of bream (*S. pagrus*). *Chrysophrys hasta*, one of Cuvier's *Daurades*, a big-headed, humpy-backed fish, resembles the "gilt-head" of England (*C. aurata*). They received their name from the ancient Greeks on account of their golden-coloured eyebrows.

SQUAMIPINNES.—Under this name Cuvier included a number of flattish fish whose extraordinary forms are fantastic both in shape and colour—such as *Chætodon*, some of which are now classed with other genera. *Chætodon pictus* is of a general yellow, marked with parallel purple lines, part of them running one way, and part another, with a broad black band across the eye. Some *Chætodons* have a long tubular beak, and it is said they shoot small stones from them at insects and other fish, but this is doubtful. They are usually of small size.

Triglidae.—Several very remarkable fish allied to gurnards frequent Ceylon seas. One has received from the Sinhalese the title of "maha-ratto-gini," or great red fire-fish (*Pterois muricata*),¹ on account of its brilliant red and scarlet hues, a very

¹ *Scorpena miles*, Benn.

voracious species inhabiting rocky places. *Pterois volitans*,¹ "maha-gini" (great fire-fish), is a smaller species of the above, less red in colour, and distinguished by an extraordinary development of its pectoral and dorsal fins, ending in a number of sharp spines, of which the native fishermen are rather afraid, considering a wound inflicted by them as poisonous; it has also four barbels or filaments hanging from the eyebrows and mouth. The flesh of this fish is considered good by the natives. It was supposed formerly that like the flying gurnard (*Dactylopterus volitans*), the *Pterois*, in consequence of its large pectoral fins, could fly likewise, but such is not the case.

SCLENIDÆ.—*Corvina miles* and *Otolithus* are pale-coloured fish, which, as well as some of the *Sillago*, are erroneously called whittings by Europeans in India; it is doubtful if the real whiting (*Gadus merlangus*) is found there or in Ceylon.

SCOMBERIDÆ.—The Seer fish (*Cybum guttatum*), one of the mackerel family, found about the island, attains a length of three feet, and is considered the finest fish in the Indian Ocean; the flesh is white, with the flavour of salmon. The little pilot fish (*Naucrates ductor*) is one of the *Scomberidæ*. The bonito (*Thynnus pelamys*) and the albacore, a species of tunny (*Scomber thynnus*) are only found in tropical seas. Their flesh when dried is called kummelmus, much used all over India and Ceylon, grated on rice and put into vegetable curries to render them more savoury. It is prepared by removing the flesh from the back bone and sprinkling it with salt water; after a time it is wrapped up in cocoa-nut leaves and buried in the sand, when it becomes quite hard and like a piece of dark wood. Pliny mentions dried fish resembling an oaken board made of tunny in the Mediterranean (ix. 18); and Ibn Batuta describes the manufacture of kummelmus in the Maldives 500 years ago, where most of it is made at the present time.

¹ *S. volitans*, Benn.

² "On coupe chaque poisson en quatre morceaux, on le fait cuire légèrement, puis on le place dans des paniers de feuilles de palmier, et on le suspend à la fumée. Lorsqu'il est parfaitement sec, on le mange. De ce pays, on en transporte dans l'Inde à la Chine, et au Yemen."—Trad. Defremery, iv. 112.

Echenis.—One of the Remora, or sucking-fish (*E. scutata*), found in Ceylon seas, is distinguished by the unusual size of its disk, nearly half the fish's total length, which is twenty inches.¹ Sucking-fish are mentioned by Aristotle, Ælian, Pliny, and other ancient authors, who imagined they could stop a vessel by adhering to it. Dampier speaks of finding them attached to the sides of his ship in the eastern seas. They also fasten themselves to floating pieces of timber or to other fish, especially sharks, these monsters of the deep being commonly found with two or three fastened on them. Abu-Zaid mentions it and the sailor-fish, among the wonders of the seas of Serendib.

Carangidæ.—Among this family are what are called cobbler-fish, from the bristle-like filaments which project from their dorsal and ventral fins. They have a flattish round form of body, generally of a pale yellow colour, marked by dark bands. *Plantax vespertilio*,² “kola-handu” of the Sinhalese, as its name implies, has some resemblance to a bat in the extraordinary development of its dorsal and ventral fins, in addition to which a fin hangs from its under jaw something like the beard of a goat; it is called the goat-fish by the Malays. The general colour of this strange and scarce species is a bright orange, and the ordinary size about one foot.

XIPHIIDÆ.—*Xiphias gladius*, the common sword-fish, is abundant in eastern seas, a fish renowned among the ancients for its courage and enmity to the whale,³ but it is doubtful if it has any instinct of the kind, although some instances have been recorded of whales being found pierced by their sword-like beaks; they have also been found sticking in the sides of ships, broken off by the force of the shock. Pliny (ix. 5) speaks of another fish hostile to the whale, which some suppose to refer to the dolphin.

A species of sword-fish (*Histiophorus immaculatus*) said to attain a length of twenty feet in the Indian seas, is called the

¹ Ann. Nat. Hist., v. 389, new series.

² *Chatodon vespertilio*, Benn.

³ Ælian, xiv. 23; Plin. xxxii. 8.

“sail or sailor-fish,” from the immense size of the dorsal fin, which being frequently raised above the water has given rise to an idea that it answers the purpose of a sail and propels the fish along. There are two varieties, one having a blue dorsal fin and the other a brown, the shape also differs with those that frequent the Indian seas; the fin develops, with the size of the fish, but in the Mediterranean species it disappears with age. The Indian species are also distinguished by two long filaments hanging from the pectoral fin.

PEDICULATI.—The walking-fish (*Antennarius*) forms one of those links between diverse species so common in nature, the bones of the carpus and pectoral fins being developed into rudimentary arms or limbs, ending in a kind of claw, which enables them to progress along the bottom of the sea by a crawling movement, but their chief locomotive organ is the tail. This development of the pectoral member is also found in all the *Lophote* family to which the *Antennarius* are allied. The *Lophotes* are called anglers and fishing frogs in England from their wide mouths, and lie concealed in the mud, only displaying a flexible horn on their nose, wriggling like a worm to decoy small fish within their reach. *Antennarius* are usually of small size and a yellow colour, with brown streaks radiating from their eyes, and have a little horn on the nose. Ælian is supposed to allude to them, saying, “There are fish in the Indian seas with feet instead of fins” (l. xvi. 18).

BLENNIIDÆ are an unpleasant-looking genus of spotted fish, among which is the sea-wolf of Northern Europe.

Salaria alticus, Cuvier’s “Sauteur,” is a very nimble little half-amphibious species, found on wet rocks and sand washed by the surf, over which they propel themselves with great speed and facility. They are a grey colour in the water, but become blue when removed from it.

Acanthurus is a genus of oval-shaped fish with rich colouring and armed with a sharp spur, concealed in a sheath-like hollow on each side near the tail, which has obtained for them the name of sea surgeon and phlebotomist. *A. vittatus*, Benn.,¹ “seweya” of the Sinhalese, is a scarce fish,

¹ *A. lineatus*, Cuv. D’Orbigny, Dic. N. H.

more than a foot long, of a blue and gold colour arranged in stripes. Allied to them is the unicorn-fish (*Naseus unicornus*), named from the long nose or beak projecting above the mouth, of various lengths in different species.

POMACENTRIDÆ.—Among this family are three curious little fish. *Chatodon Brownriggii*, “kaha bartikyah” of the Sinhalese, is only two inches long, with a yellow body and fins and purple streaks along the back. *Amphiprion Clarkii*,¹ about four inches in length, has a yellow head, tail, and ventral fins, and purple body, with a pure white diagonal band. *Dascyllus aruanus* is a slate-colour, with three white perpendicular bands.

LABRIDÆ.—Several genera of fish, chiefly *Scarus* and *Sparidæ*, are now grouped together under the general name of *Labridæ*, or lip-fish, being distinguished by thick fleshy lips. They are principally herbaceous fish, or those “who browse on coral and other *Lithophytes* growing in the sea, just as ruminant animals crop the green herbage of the dry land. Their teeth consist of strata of prismatic denticles standing vertically, admirably adapted to their habits and exigencies.”² Their form generally resembles that of a perch, and in colouring they are the most beautiful of all the tropical fish, living gems of the ocean, but have a bad reputation as food, many of them being poisonous. Several of the most remarkable are called “girawah”, (Parrot-fish) by the Sinhalese. *Sparus decussatus*, “hembili-girawah,” or basket parrot-fish, is a bright green colour with yellow markings like basket-work. *Julis dorsalis*,³ “mal-girawah,” or flower parrot-fish, has a crimson and green head, while green, crimson, white, grey, blue, and yellow are scattered in patches over the body, and the upper part has several perpendicular black bands. *Scarus harid*,⁴ “laboo-girawah,” is a very scarce and exceedingly beautiful fish with tessellated markings in pale blue on a yellow ground, the tail is yellow and the fins brown. *Gomphosus viridus* of Bennett⁵ is a beaked fish of a deep green colour, very scarce, called the “talipat-

¹ Bennet, Cey. Fishes.

² Owen, “Anatomy of Vertebrata,” i. 378.

³ *Sparus Hardwickii*, Benn.

⁴ *Scarus pepo*, Benn.

⁵ *G. cæruleus*, Cuv.

girawah." *G. fustus* is a brown-coloured variety, named "koppera-girawah" by the natives, and *G. tricolor* is green, with a broad oblique yellow band across the shoulders, and violet pectoral fins.

SCOMBRESOCIDÆ.—Many varieties of half-beaks, or gar-fish (*Belone*), are found in Indian seas, both in salt and fresh water. The head and beak are nearly as long as the body.

Exocætus.—Flying-fish, in form and colour resemble herrings, the pectoral fin is developed into a kind of wing which sustains them in the air when they leap out of the sea, and scud over the waves some forty or fifty yards, when they drop into the water again; it is doubtful if they ever flap or use their wings as birds do, and on this point there is a great difference of opinion, it not being an easy matter to ascertain with certainty, as their flight out of the water and into it again is both sudden and rapid. Vessels in the tropics constantly send shoals of them flying from under their bows as they sail along, and at night they occasionally fly on board, being attracted by the lights.

It is often stated in books that "the poor flying-fish have a bad time of it, being incessantly pursued by dolphins and other voracious fish, leaping from the water to escape them, and when in the air are pounced upon by sea birds." This is a mistake, they are rarely touched by sea birds, and often leave the water when no pursuing fish are near, although, no doubt, they are much preyed upon by hungry dolphins and bonitos. Some flying-fish have barbels, as the *Exocætus Dussumieri*, and others have short pectoral fins. *E. altipennis* has a spiny dorsal fin near the tail, and a reddish streak along the back. They are occasionally sold in the Colombo market.

CLUPEIDÆ.—Eastern seas are frequented by vast shoals of *Clupea* and *Engraulis*, variously called sardines, sprats, or anchovies; they are occasionally caught on the shores of Ceylon, Malabar, Java, and other places in such myriads as to rival those of European waters, swimming near the surface and making short leaps above the sea as they go along. Friar Odoric mentions the great shoals of small fish he saw near

Java. One of the *Engraulis*,¹ made into a condiment called "red fish" by the Malays, occasionally visits the Sea of Madura. Two species of sardine are found on the coasts of Ceylon, *Sardinella leiogaster*, and *S. neohowii*, called the oil sardine. *Engraulis Brownii*, Cuv., is a species of anchovy, and *Albula conorhynchus*, a perfectly white variety of herring.

MURÆNIDÆ are common in tropical seas, including black, and conger eels. *Anguilla mauritiana* is the yellow spotted *muræna* of the Mediterranean, so much praised by Roman epicures of old, who are said to have fed them with their slaves. *Muræichthys vermiformis* is a very fine thread-like eel. *Muræna macrurus*, Bleek., has been found ten feet long.

Congers and several allied species of eels are now thought by some naturalists to undergo a metamorphosis when young, something similar to the change from the tadpole to the frog, and to be what are called glass eels (*Leptocephalidæ*), tape-worm like fish with a low organization, found both in European and tropical seas.²

SYNGNATHIDÆ, or pipe-fish, are occasionally seen in eastern seas, some entering fresh waters. The head of these curious fish runs out into a long tubular snout, half the length of the body; and the male fish carry their ova in a kind of pouch formed of cutaneous folds near the tail.

The sea-horse (*Hippocampus*), although found in India and the eastern coast of Africa, has not yet been noticed in Ceylon.

PLECTOGNATHI.—*Sclerodermi*, in their general formation, present some analogy to the tortoise, being covered with either an exceedingly tough or horny skin. In the singular variety called "coffer or trunk-fish" (*Ostracion cubicus*), about fifteen inches long, the skin forms a kind of cuirass composed of a number of small quadrangular compartments joined together, the fins and tail working in sockets formed in the shell. Some species have triangular, others sexangular skins. The *Balistes*, or trigger-fish, another genus with a leathery skin, are armed with sharp spines along the back or sides,

¹ Sometimes called *Atherina Japonica*, but the true *Atherina* is another genus of fish, Cuvier, x. 422, 458.

² Gunther, viii. 136.

which they can suddenly project out. *B. viridus* has six of them on each side, near the tail. *B. biaculeatus*, "rattoopotobarah" of the Sinhalese, is about nine inches long, of an olive colour, with several narrow red diagonal bands and a red tail.

Gymnodontes.—Urchin-fish and balloon-fish (*Diodon*) are allied to *Sclerodermi*, and mostly round like a ball, having the power of inflating themselves to float on the sea, and are generally richly coloured. *Tetrodon ocellatus*, "jub-potobarah" of the Sinhalese, about five inches in diameter, is a green and yellow colour, with a blue eye on the back. *Tetrodon fluviatilis*, found in the fresh waters of Ceylon and the Ganges, is a kind of urchin-fish, with rather a smooth skin, having hidden spines or prickles.

Scyllidæ.—The most remarkable of the dog-fish, *Mustelus*, *Scyllium*, &c., found in Ceylon is the *Stegostoma tigrinum*, a brownish-yellow marked with black or brown stripes, like a tiger, and attains a length of six feet.

Sharks.—There are said to be 140 different species of sharks in various parts of the world. The white shark¹ is the most dreaded and common in tropical seas. Large numbers of immense size are taken at Calpenty, and other parts of Ceylon, for the sake of their oil and fins, which are dried and sent to China, where they are made into a thick glutinous soup, which forms one of the delights of the Chinese epicures, who think it far superior to turtle soup. Sharks' skins are covered with rough stony tubercles, said to form the substance called shagreen manufactured in China.

The blue shark (*Squalus glaucus*) and the extraordinary hammer-headed shark (*Sphyrnias sygæna*) are found in Indian seas.

Sharks are usually accompanied by two or three little cross-barred, blue and white pilot-fish (*Naucrates ductor*), and there is something mysterious in the connection between them that has never been satisfactorily explained. The arrival of a shark in the wake of a vessel is generally announced a day or two before by the appearance of the pilot-fish alone, and after

¹ *Charcharodon Rondeletii*.

a short stay they disappear, returning in company with the shark, and have been known to follow ships some days after a shark has been caught.

PRISTINIDÆ.—Saw-fish attain an immense size in Ceylon, being caught upwards of eighteen feet long; they resemble sharks in the body, but have a long flat beak armed with teeth projecting on each side forming a double saw, and are formidable inhabitants of the deep, charging, it is said, among a shoal of smaller fish, slaying right and left, and then devouring their victims at leisure.

RAJIDA.—Ceylon seas swarm with rays. Among the common species is the thorny ray (*Raja asperima*). The *Raja narinari*,² a remarkable species with a head more like a bird than a fish, and a very long tail, is either identical or allied to the sea-eagle of the Greeks (*Raia aquila* of Linnæus), found in the Mediterranean, where it is said to attain a weight of 800 lbs., and some have been found about Ceylon twenty feet broad. They are supposed to live on shell-fish, being provided with a jaw and mouth of peculiar construction, filled with many rows of short teeth arranged in quincunx, capable of crushing the largest and hardest shells, and have lately been making great ravages among the pearl oysters (*Vide* ch. xxx.)

An allied genus of ray called the sea-devil (*Raja diabolus*), Diable de mer of the French, has a hundred rows of teeth, and, according to accounts, approaches the dimensions of a small islet, being probably the creature alluded to by Sinbad, who speaks of a fish as large as an island. They are occasionally seen in the Indian seas, at Manilla and on the coast of Brazil. Levaillant says on his voyage round the Cape of Good Hope, "one struck against the ship's rudder with such force they thought they had run on a rock, and it seemed to be nearly as long as their vessel; they caught one afterwards twenty-eight feet long, and twenty-one feet wide, with a thickness of twenty-two inches."³

Poisonous fish.—Many of the fish that have been described

¹ *Pristis antiquorum*, Lath.

² *Myliobates narinari*, Cuv., Dict. Nat.

³ Voyage, v. 1, 4.

are more or less poisonous—as the *Scarus*, the unicorn-fish, most of the trigger-fish, the balloon-fish, the clupea, the boneto, and the sardines. Numbers of prisoners confined in the gaol at Chilaw were poisoned in 1829 from eating sardines, and fishermen often die from the same cause. In 1824 a law was passed forbidding persons to catch them during the months of December and January, the time of the year when they are considered dangerous.

The hawk's-bill turtle (*Caretta imbricata*) and the edible turtle (*C. midas*) are always unwholesome and often poisonous. Great numbers of them are eaten by the natives notwithstanding the frequent fatal results. In 1841 twenty-eight persons were poisoned, of whom eighteen died during the night, from eating the edible turtle; no difference, it is said, was perceptible in its appearance, only it was fatter than usual.¹

This subject is one involved in much mystery, and no very satisfactory explanation has been offered why a fish should be poisonous at one time of the year and not so at another. In the Annals of Nat. Hist. for 1867 there is a review of a work on poisonous fish by M. Dumeril, who enters fully into the subject. At Bourbon and Mauritius none of the *Scari* are eaten between December and March, the season when coral is growing, as these fish eat great quantities of polypi. The sardine of the Antilles (*Harengula humeralis*) causes fever and even death when captured near vessels sheathed with copper, or when they have eaten *Physalia*. The Guadeloupe sardine is dangerous at all times.

Fish captured by means of menispermads, *Veratrum sabadilla*, *Hydnocarpus inebrians*, and some other plants thrown into the water, are dangerous, but they are innocuous from *Barringtonia speciosa*, *Calophyllum*, and *Cerbera æchonai*.

Some fish are more venomous when old than when young. *Caranx fallax* is forbidden to be sold at Havana if they weigh more than one "kilo," and this is a rule with suspected fish in the West Indies. The ova of pike, barbel, and burbot are purgative and dangerous during spawning time. The becuna of the Antilles (*Sphyræna becuna*) are poisonous when the roots

¹ "Céolombo Observer," Oct. 27, 1841.

of their teeth are not black. Mackerel of St. Helena are constantly poisonous if kept for a single night, and bonito should be very fresh when eaten. If a silver spoon becomes black, forming sulphate of silver when plunged into a vessel in which fish are being cooked, it is a sign they are poisonous, but is not infallible.

T. ocellatus is one of the most poisonous of fish. It is said, when the Japanese wish to commit suicide they eat them; yet they are an article of food in China and Egypt, requiring, however, great care in cleaning. Another very venomous fish is the clupa of the Antilles (*Meletta thrissa*), so much so that fish who eat them are suspected; and *M. venenosa* of Indian seas is equally noxious.

Fresh-water fish swarm in all the lower parts of Ceylon. Knox very aptly remarks "that every ditch and little splash of water hath fish in it," and although they are rarely eaten by Europeans, the Sinhalese use them habitually for food. Sir S. Baker says he ate some called "loola" by the natives (*Ophiocephalus striatus*), and found them excellent.¹ It is only within recent years that anything has been known about the fresh-water fish of Ceylon, several persons in the colony having made collections which have been brought to Europe, and found their way into the British Museum by purchase or gift; they are described in Günther's work. Dr. Bleeker has also described several new species in Dutch periodicals devoted to natural history.

Cyprinidæ and *Siluridæ* are the most common, also mullets, perch, and gobies, found chiefly about the muddy mouths of rivers. None of the small silurads inhabiting the mountain streams of India have been noticed, although a kind of dace, with four barbels (*Danio micronema*), of the rocky rivers of the Sikkim Himalaya has been taken in the mountain streams of the island.

Travelling and burying fish.—It is now a well-established fact that in all tropical and very warm climates there are many species of fresh-water fish that can live a long time without water, and travel from one part to another, or bury in the mud

¹ "Rifle and Hound," p. 45.

as tanks dry up from the great heat and long absence of rain. It is remarkable that although the ancient Greeks and Romans were aware of the existence of travelling and burying fish in India, almost none of the mediæval and modern¹ writers or

¹ Sir E. Tennent, i. 219, writing of burying fish, says, "The Mareb, one of the sources of the Nile, the waters of which are partly absorbed in traversing the plains of Taka; during summer its bed is dry, and in the slime at the depth of more than six feet, is found a species of fish without scales." In this he appears to have confounded the account given by Quatrefère, *Mém. sur l'Égypte*, ii. 17, of fish dug up at Dongola in Nubia, with that given in a note where he quotes Le Grand, who cites an MS. of the Patriarch Mendes (*Relation du Père Lobo*), saying, "when the Portuguese made war in Abyssinia, by digging in the sand where the river Mareb lost itself, they found good water and fish." "*La rivière tombe d'un rocher et se cache sous terre; lorsque les Portuguais ont fait la guerre en ces pays là ils fouilloient dans le sable et y trouvoient de la bonne eau et du bon poisson*," p. 213. R. P. Manoel d'Almeida, a Jesuit, who had previously described this place, says nothing about the Portuguese. His words are, "*La rivière appelé Mareb commence dans le Royaume de Tigre à deux lieues de Baroa . . . et prenant après son cours vers le sud, entre dans un pays des Cañers, où il n'y a presque que des sablons, sous lesquels elle se cache une grande espace de chemin; ceux de pays ne laissent pas d'eau boire en creusant neuf ou dix pieds en terre et mesme ils y peschent de bon poisson*," p. 5, ed. Douai, 1673. The place thus described is in Abyssinia, and a long way from Dongola in Nubia, where the large fish without scales were dug up, as mentioned in Quatremère, and Manoel's description does not seem to refer to burying fish. Sir E. Tennent adds in a note, "the account of Mendes is confirmed in a MS. of Manoel in the British Museum, from which Balthazar Tellez compiled his history of Ethiopia, who says he was told by João Gabriel, a creole Portuguese, born in Abyssinia, who had visited Mareb, that fish were to be found everywhere . . . and that he had eaten them." In the French edition of Manoel already quoted, which was taken from Balthazar Tellez, Gabriel is called the chief of the Portuguese, but there is no allusion to fish of any kind in connection with him; evidently there is some confusion here. There is no mention of this circumstance in Padre Lobo's account of Abyssinia, neither in the French edition 1673, nor in Pinkerton's *Collection of Travels*. Sir E. Tennent, writing of the little knowledge Europeans had of migratory fish, says, "Beckman, who in 1736 published his commentary on the collection *Περὶ θαυμασιῶν ἀκουσμάτων*, ascribed to Aristotle, has given a list of the authorities about his own time—G. Agricola, Gesner, Rondelet, Dalechamp, Bomare, and Gronovius, who not only gave credence to the assertions of Theophrastus, but adduced modern instances in corroboration of his Indian authorities," i. 229. This Beckman was not born until 1739, and published his commentary on the "*Mirabilibus auscultationibus*" at Gottingen, in 1786. Again, so far from Rondelet being a contemporary of his, the French naturalist was born in 1507, and he only adduces the instance of the eel which can struggle some distance through wet grass, as a reason for supposing the statement of Theophrastus to be true. *Vide* "*Rondeletius de Piscibus*," Lyon, 1558. Dalechamp and C. Gesner lived about the same time as Rondelet, and L. Gronovius published his work on fish in 1754, and his brother in 1763.

travellers appear to have known anything about them, until Bloch, in the middle of the last century, described some *Ophiocephalie* that were sent from Tranquebar.

Theophrastus, a pupil of Aristotle, the first to notice these singular fish, says, "There are in the Indies fish which pass part of their time on land, leaving the rivers to wander about like frogs." He also mentions a species near Babylon which, "when the river runs low leave the dry channel in search of food, moving by their tails and fins," and others that were dug up at Heraclea Pontus. Pliny (ix. 35—83), quoting Theophrastus, remarks, "There are in the rivers of India fish which come on shore, passing over into standing waters and streams to spawn." Aristotle,¹ Strabo, Juvenal, and Seneca also mention them in other places, but the two latter ridicule the idea, and Polybius has written about fish that were found under ground near Narbonne—probably fossils, as there are none of the genus of fish we are describing in Europe.

The sudden appearance of full-grown fish in places flooded by the monsoons which were previously quite dry, has given rise to many conjectures, and some supposed they fall from the clouds, but there is no doubt they migrate during the rains. Towards the end of the dry season, as pools and tanks dry up, some of the fish in them gradually sink into the muddy bottom, where they remain until the rains liberate them, while the majority make their way out to rivers and other places where there is water, returning during the change of the monsoons, being guided by their instinct, which tells them that their old haunts are again full. Quantities are caught by the natives in the manner described by Knox: "when the ponds are drying up they jibb down a funnel-shaped basket, and the end sticks in the mud, which often happens on a fish which, when they feel beating against the sides, they take it out and reve a rattan through its gills."²

Pallegoix asserts that in Siam fish will wander more than a league from water; he says, "some years since a great heat dried up all the ponds near Anyuthia; during the night torrents of rain fell; next day, going for a walk into the country,

¹ Hist. Anim., vi. 15; De Resp., ch. ix.

² Relation, p. 20.

great was my surprise at seeing the ponds almost full, and a quantity of fish leaping about. A labourer told me, on my inquiring where they came from, that they arrived during the rain." Again, he says, "the Bishop in 1831 bought a number of live fish and put them into a pond, but in less than a month they all escaped during rain that fell at night."¹

Herodotus surmised that the fish found in places inundated by the Nile were produced from the spawn of the previous year which had remained in the mud, and Mr. Yarrell, in his "History of British Fish," revives the idea,² but the fish found in places flooded by the monsoons are full-grown ones. It is also very doubtful that any ova is deposited in places subject to periodical drying up, as it would probably be destroyed by the heat of the sun.

It has been stated³ that fish are often dug up by the natives in Ceylon from the beds of tanks and places "where the surface is quite dry, the clay below in which they are found alive, being firm but moist." It is a question whether this is not a mistake, unless there was some aperture to admit air. The Rev. Mr. Boake, long resident in Ceylon, "doubts if fish have ever been so found in the island, as he has often offered rewards unsuccessfully to the natives for them."⁴ They can, however, exist in mud so thick it would be impossible for it to pass through their gills, by taking in air from the surface at intervals, being, he says, air-breathers, which he ascertained by experiment: a number of fish were placed in water covered by a net, so that they could not reach the surface; after a short time it was found they made violent efforts to reach the air, and all eventually died from want of it—the *Anabis* in an hour and a quarter, and the *Ophiocephalæ* and (*Clarias Teysmanni*), one of the *Siluridæ*, in about six hours. Cuvier accounted for the *Anabis* and *Ophiocephalæ* being able to travel over dry land from the peculiar construction of their gills, having labyrinthiform pharyngeal bones forming cells, which retain moisture, and an intestinal sac containing a reserve of water.⁵ But the experiments of Mr. Boake tend to show that

¹ Trav. in Siam, i. 113, 193.

⁴ J. Cey. R. A. S., 1865.

² Intro. xxvi.

³ Tennent.

⁵ Hist. des Poiss., vii. 399, 330.

they are as much amphibia as fish in their natures, and must have either lungs as well as gills, or some unexplained means of breathing air. In the case of the *Anabis* it seems as difficult to explain why they should require to breathe air at intervals, as why some fish have no air-bladder—such as flat fish and mackerel, or why the bladders of perch and some other fish are closed.

True fish breathe water by means of gills; to respire air, aquatic animals, according to naturalists, require both gills and lungs—as the *Siren lacertina*, an eel-shaped fish of the marshes of South Carolina, and the *Proteus* of Carniola; however, recent investigations, it is said, “show that the air-bags of fish are organs analogous to the lowest rudimentary state of lungs in the higher animals, and differ little from the lungs of the *Proteus*, yet the respiration of atmospheric air has been proved quite unnecessary to the *Proteus*, although classed as an amphibian, and, as well as the mud-fish, often rises to the surface to take in air, though it never appears to enter the rudimentary lungs, being invariably expelled by the branchial apertures; they also never show any disposition to emerge from the water as amphibia proper do.”¹

Many instances are given of fish without respiratory organs, being dug up in various parts of the world, and their gills are probably kept moist by internal means to enable them to exist in firm clay without breathing water through them. The Dutch keep carp alive for more than three weeks by hanging them up in a cool place surrounded with damp moss in a net, feeding them with bread soaked in milk. The *Callichthys littoralis*, or bush-fish of South America, are said to exist in muddy lakes, without any water, and great numbers of them are, sometimes dug up. The author of “Ayen Akbery” relates that in the Soobah of Kashmir, after the rainy season and the water has subsided, the inhabitants take sticks an ell long, which they work about in the mud, and find large fish.² In the annals of Natural History for 1867 there is an account of a new species of mud-fish (*Neochanna apoda*) devoid of ventral fins, recently

¹ “Land and Water,” June, 1875.

² Gladwin's *Vern.*, 1782, p. 166; Bosc. *Mig. Fish of Carolina*, P. Z. S., 1856.

dug up in New Zealand four feet from the surface in a stiff clay among the roots of trees, thirty-seven feet above the level of the river, having been at one time a back-water during floods. When the fish were extracted and placed in water they moved a little, but soon died, and are surmised to have been buried many years. The early settlers in the same colony are stated to have often dug up fish along with the potatoes they had planted in swampy ground. The hybernation of eels in cold weather has been already mentioned. They are frequently captured in muddy places with spears thrust into the slime in tidal rivers when the water is low, and are said when confined in ponds to become restless in the month of August, and try to effect their escape from them.

The remarkable *Lepidosiren annectens*, a mud-fish of South Africa, in its outward form and internal organization, is intermediate between fish and reptiles. Some regard it as an amphibian, others, although it possesses lungs, say it ought to rank as a fish, its gills being covered by opercula, and not exposed as in amphibia proper.¹ Some of them in the menagerie at Paris were induced to æstivate in the mud of the aquarium, which was allowed to harden and crack by draining off the water. Eleven weeks after the disappearance of the fish below, they were found enveloped in cocoons moulded in the block of mud and alive, moving when touched. An abundant mucosity appears on their bodies about the time of æstivation, this agglutinates the portion of the soil they traverse, so that the walls of the subterranean canal made by the animal when descending remain open after desiccation, admitting air, and when it stops forms the cocoon, having a hole near the mouth. The *Lepidosiren* does not breathe through the nostrils, which are two blind sacs as in fish.

Dr. John Hunter, the celebrated surgeon, remarks in one of his works, that hybernation in the animal kingdom is not altogether the result of cold, but in a great measure proceeds from the usual supply of food being cut off by the frost. This theory is exemplified in many instances in Ceylon and tropical climates, where the bat and other creatures who can obtain

¹ Jones, Anim. Kingd. p. 714, ed. 1871; Ann. Nat. Hist., 1866, pp. 160, 715.

food remain in activity all the year, while many aquatic animals æstivate during the dry season, which puts a stop to their means of sustenance. It was also shown in the case of a *Lepidosiren*, in the zoological department of the Crystal Palace, London, which in its native country habitually buries itself in the mud during the dry season, being a species that cannot travel; but in its new home in England showed no disposition to æstivate, because it was constantly supplied with food, although a quantity of mud was placed in the aquarium to induce it to do so. It was fed with frogs, and found to be very voracious, devouring the gold-fish in the basin, and increased rapidly in size—growing from ten to thirty inches in length in three years.

LABYRINTHICAL.—The most remarkable of the travelling fish is the *Anabis scandens*, “kannaya,” of the Sinhalese, and “paniyeri,” or tree climber of the Tamils, also called the “sennal” and travelling perch, but it is not a perch strictly speaking, although very like one in appearance. They usually migrate during showers, or when the dew is heavy at night, but are said to have been seen moving along a dusty road in the day-time,¹ using their strong pectoral fins to propel themselves forward. The doras, or travelling fish of Guiana, according to Sir R. Schomburgk, move in a similar manner, and at a pretty quick rate.² Sir J. Bowring says, when ascending the river Meinan in Siam he was amused at the novel sight of fish leaving the river, gliding over the wet banks, and losing themselves among the trees of the jungle.”³

The *Anabis* was first brought to the notice of Europeans in 1791 by Lient. Daldorf of the Danish settlement at Tranquebar, on the Coromandel coast, who stated he “saw one in a moist cavity two yards up the trunk of a palmyra palm which grew near a lake, and that it was struggling to get higher when he seized it in his hand.” This relation, which is given in the third volume of the “Transactions of the Linnean Society,” created quite a sensation among the learned of the time. Although Abu Zaid a thousand years since mentioned that

¹ Layard, Ann. Nat. Hist., 1853, p. 390. ² Naturalist's Lib.; xxx. 113.

³ Trav. in Siam, i. 10.

there were climbing-fish in India "ascending palm-trees to drink their juice, and then returning to the sea."

Considerable doubt has been thrown on the statement, and the tree climbing suspected to be a very rare circumstance; there is no occasion on which the *Anabis* have ever been seen by a European in Ceylon when thus engaged, nor by any in India since Daldorf and another Dane saw them, although the Tamils are perfectly aware of this propensity and express no surprise at it, but the *Anabis* frequently climb over fish-weirs and enclosures in rivers, and for this reason the Sinhalese sometimes cover these places with nets to prevent their escaping. H. Buchanan, in his account of the Ganges fishes, doubts it altogether, and says they can only travel over level ground. The subject was revived in 1864 by Captain Mitchell in the Annals of Nat. Hist., writing from Madras on the testimony of a Tamil Moodliar and other natives, and there appears to be no reason to doubt, "however strange it may appear, that the *Anabis* does in reality climb several feet up palmyras during heavy rains when the water runs down the trunks of the trees, but only in particular localities where palms grow near the sides of tanks," the probable object being to search for the numerous insects that are found in the hollows at the base of the leaves. •

There are two species found in Ceylon, one identical with that described by Cuvier; and a smaller variety *A. oligolepis* about four inches long. Also a *Polyacanthus* called "pooloota" by the Sinhalese, resembling the *Anabis*, of a reddish olive colour.

Ophiocephalidæ have heads resembling snakes with narrow bodies of an olive colour, some are striped diagonally. There being several varieties called "loola," "connia," &c. by the natives, and are very common in shallow weedy tanks and muddy marshes, also in the Ganges, H. Buchanan¹ states they are kept alive for five or six days by the Hindus in earthen vessels without water. The jugglers of Calcutta exhibit them in the bazaars to amuse the crowd with their movements, and they are found sometimes so far from water, the natives imagine they fall from the clouds.

¹ "Fish of the Ganges," ed. 1822.

GOBIDÆ.—Two species of *Periophthalmus* are also able to progress out of water in humid places for a short distance, hunting after insects. A great portion of the base of the pectoral fin in this genus is very scaly and furnished with strong muscles, which they use for locomotion on land.¹ They are remarkable looking fish, very like gobies in England, with a peculiar head, and rather long body of a light olive brown colour and a violet dorsal fin with a black band. *P. papilio* has a double dorsal fin like a butterfly's wing; they are also found in India, the Pacific, and Australia.

Mastacembelus armatus is a long narrow brown fish, sometimes attaining a length of two feet, with a very small head and a pointed snout, slightly turned up, the caudal fins and tail are united. They are found in Nepal and many parts of the East, descending into the mud in the dry season, and their peculiar snout is supposed to enable them to search for food in it. Some of them were brought to Europe from Aleppo by Alex. Russell in the middle of the last century.² The *Rynchobdella Aral* in some respects resembles the *Mastacembelus*, having the same shaped head with a snout, but it is turned downwards, the body is also much shorter and thicker, having less of an eel-like form, and the caudal fins and tail are separated. Cuvier's description was taken from one obtained by Laurent Gronovius from Ceylon, and there is reason to suppose it is only a variety of *Mastacembelus*, called Theliya by the natives.

CHROMEDES are a genus of fish with deep flat bodies, very numerous in the tropical parts of America and Africa on the western coast, and some are found in the pools of the Sahara, but only one species has been noticed in Western India, *Etroplus Surattensis*, Cuv., of a greenish colour with white bands, also found in Ceylon, where it is named "rallia," as well as another variety, *E. maculatus*, Gunth., called "corallia" by the natives.

SILURIDÆ.—Some sheat fish resemble eels with barbels, and are very numerous in tropical fresh waters. *Saccobranchis microps* and *S. microcephalus*, are two remarkable species

¹ Gunther.² Nat. Hist. Aleppo, 1756.

found in Ceylon, the upper part of the body is brownish or slate colour, and the abdomen pinkish; the eyes are exceedingly small, and there are several barbels growing about the nose. Many varieties of *Arius* so numerous in Indian rivers appear to be wanting in Ceylon, but two remarkable species called "angaluwa" by the Sinhalese, *A. Boakii* and *A. Layardii*, identical with *A. fissus* of South America, have recently been discovered at Caltura by the Rev. Mr. Bonke, who sent some home and were described by W. Turner in the "Reports of the British Association" for 1866,¹ and are of great interest to naturalists, being the only instance known of fish in the old world who carry their ova in their mouths.

Some years since Dr. Gunther's attention was attracted to the distended appearance of the mouth of an *Arius* sent from South America, and upon examination was surprised to find twenty eggs the size of a pea inside,² showing the existence of a genus of fish having ova of a large size, but few in number, and carried by the male in its mouth until it arrives at ovarian maturity.

The Sinhalese eat the eggs in curries and also fry them. The fish are about fourteen inches long, and when held up by the tail, the eggs, usually twelve in number and the size of a small bullet, drop out.

CYPRINIDÆ.—This extensive family comprising carp, roach, tench, gudgeon, bream, dace, chub, and barbels, have many representatives in Ceylon, the most numerous being barbels, but several of the *Cyprinidæ* found in Indian rivers have not been noticed in the island.³ The barbels attached to the mouths of most of this family is an organ having a very delicate sense of touch and being usually found in fish who feed near or in mud, is supposed to assist them in obtaining food. Among the gudgeon is the *Crossochillus reba* of H. Buchanan,⁴ about eleven inches long, very numerous in the rivers of Western India, Africa and Java. And there is a sucking-carp (*Garra*

¹ Also in Cey. J. R. A. S., 1865.

² Ann. Nat. Hist., xviii. 473; Gunther, Fishes, v. 173.

³ J. A. S. Beng., 1839, p. 671.

⁴ *Cirrhitina Dussumierii*, Cuv.

Ceylonicus). The upper lip being modified into a suction disc. It is a scaly fish having from two to four barbels. A grey sucking carp ~~is~~ found in the fur country of North America.¹

Mr. Yarrell gives several instances of the power possessed by fish, particularly *Cyprinidæ* of enduring the extremes of heat and cold; the gold-fish, *C. aurea* and the sucking-carp have been frozen in a lump of ice without killing them, and Humboldt and Bonpland state, what seems hardly credible, that in South America they perceived fish thrown up alive from a volcano along with water having a temperature within a few degrees of the boiling point. Several *Cyprinidæ* were found by M. Reynaud in the warm springs of Kannea near Trincomalee, where the temperature varies from 85° to 115° Fahrenheit, including a kind of roach or dace (*Leuciscus thermalis*) about two inches long, an exceedingly small loach (*Cobites thermalis*) little more than an inch long, marked with brown spots, and a barbel with four filaments (*Nuria thermalis*) also inhabiting the warm springs of India and Assam. Two little perch were also found by M. Reynaud at Kannea (*Apogon thermalis*) about three inches long, of a red colour with black spots, similar to the *Apogon* of the Red Sea, and the *Ambassis thermalis*, Cuv., of a green colour with a silver band, recently found in the fresh waters of the Mozambique Channel.

Nemachilus urophthalmus is a curious little tawny fish marked like a tiger, also found in India and Java, a variety inhabits the lake of Galilee and another the Tigris.

Showers of fish.—The phenomenon of small fish falling from the clouds during heavy rains and thunder storms, is more frequent in India than Ceylon, where it is rare. It is conjectured that they are drawn up from the sea by water spouts, but in India live fresh water species are said to have been picked up alive after storms of rain. Query, were they not migratory fish? Dr. Buist in an article in the "Bombay Times," 1856² mentions many instances of this kind. In July 1826, a number of *Cyprinus* were found at Moradabad during a storm. A fall of large fish occurred at Nokulpatt in Feb.

¹ Richardson, Fauna Borealis.

² Quoted by Sir E. Tennent.

1830, but in this instance they were all dead and many in a putrid state. In 1852 numbers fell at Poonah more than half a mile from any water. According to the Journal of the Asiatic Society of Bengal, a shower of *Clupea* occurred on the Jumna, May 16, 1834; and fish were found in the pluviometer at Benares in 1833, some quite fresh and others without heads.¹

Quatremère in his *Mémoire sur l'Égypte* says, "Arabian authors relate that a shower of serpents occurred at Schezer, a town of Syria, in year 775 of the Hegira, and the same thing happened at Zeila in Abyssinia when many people died from their bites. There was a shower of green frogs in the year 833 of the Hegira which covered the houses and streets of Hermes. Showers of rats, fish, and frogs are also stated to have happened by several ancient authors quoted by him.

Dr. Livingstone mentions that the natives say, showers of frogs fall from the clouds in South Africa. It is conjectured in these instances that the frogs do not actually fall from the sky, being merely brought forth in unusual number by the rain from some place, and spread themselves over the neighbourhood, but if fresh water fish can be drawn up by whirlwinds or storms from rivers and tanks, why not frogs also.

Fish traps.—The Sinhalese have several ingenious ways of catching fish in weirs and staked enclosures formed on the principle of the eel traps used in England, and also intoxicate fish with various poisonous drugs which, as already mentioned, renders them dangerous as food.

¹ J. A. S. B., 1833, p. 656, 1834, p. 366.

LIST OF CEYLON FISH.

Taken from Cuvier, and Günther's Catalogue of Fish.

† Not in Tennent, many of which are new.

ACANTHOPTERYGII.

Holocentrum ruber, *Benn.*

diadem, *Cuv.* iii. 213.

Serranus biguttatus, *Cuv.* vi.

pachycentrum, *Cuv.*

guttatus.

punctulatus, *Cuv.* ii. 367.

Serranus faveatus, *Cuv.* ii. 329.

bontoo, *Cuv.* ii. 334.

Sonnerati, *Cuv.* ii. 299.

marginalis, *Cuv.*

flavo-cæruleus, *Cuv.*

angularis, *Cuv.*

lemnescatus, *Cuv.* ii. 240.

- Serranus amboinensis*, *Cuv.*
Diacope marginata, *Cuv.*
spilura, *Benn.*
Apogon Zeylonicus, *Cuv.* iii. 491.
thermalis, *Cuv.*
Ambassis thermalis, *Cuv.* ii.
Diacope xanthopes, *Cuv.* iii. 495.
Perca argentea, *Benn.*
Dules thermalis, *Cuv.* iii. 492.
rosipenis, *Cuv.* iii. 490.
Therapon trivittatus, *Buch.* •
Diagramma punctatum, *Cuv.* v. 303.
limatum, *Cuv.*
pacilopterus, *Cuv.*
blochii, *Cuv.* v. 309.
orientale, *Cuv.* v. 299.
Lobotes erate, *Cuv.* v. 323.
Genes oblongus, *Cuv.* vi. 479.
Mesoprion rangus, *Cuv.* ii. 481.
anularis, *Cuv.*
aurolineatus, *Cuv.*
Scolopis japonicus, *Cuv.* v.
binnaculatus, *Cuv.* v. 340.
Dentix furcosus, *Cuv.* vi.
Smaris balteatus, *Cuv.* vi. 424.
Cæsis cæruleanus, *Lacép.*
Upeneus vittatus, *Cuv.* (nullus or
mulloides, *Lacép.*)
tæniopterus, *Cuv.*
bifasciatus, *Cuv.*
Zeylonicus, *Cuv.*
cinnabarinus, *Cuv.* iii. 475.
Lethrinus ramak, *Forst.*
erythrurus, *Cuv.* vi. 293.
opercularis, *Cuv.*
cinereus.
faciatus.
frenatus.
rostratus, *Cuv.*
Pagrus longifilis, *Cuv.* vi. 159.
Merou boelang, *Cuv.* vi.
Apselus fuscus, *Cuv.* vi. 549.
†*Sparodon heterodon*, *Bleek.*
Chrysophrys hasta, *Cuv.*
Chatodon Layardii, *Blyth.*
pictus, *Cuv.* vii.
vagabundus, *Benn.*, *Cuv.* viii. 50.
guttatissimus.
xanthocephalus.
artromaculatus, *Benn.*
- Heniochus macrolepidotus*.
Holocanthus annularis, *Cuv.* vii.
178.
xanthurus, *Benn.*
imperator, *Block.*
Ephippus orbus, *Cuv.*
Scorpena polyprion, *Cuv.*
Pterois volitans, *Cuv.*
muricata, *Cuv.* iv. 363.
Tetraroge longispinis.
Platycephalus punctatus, *Cuv.* iv.
243.
serratus, *Cuv.*
tuberculatus, *Cuv.* iv. 258.
Sillago punctata, *Cuv.*
erythrea, *Cuv.*
Corvina miles, *Cuv.* v. 94.
plagiostoma, *Bleek.*
Otolithus argenteus, *Cuv.*
Polynemus tetradactylus, *Cuv.*
Scomber thynnus, *Cuv.*
Thynnus pelamys, *Cuv.* •
Cybum guttatum, *Cuv.* viii. 173.
Naucrates ductor, *Cuv.* viii. 324.
†*Echinis scuta*, *Gün.*
Coryphaena hippurus, *Linn.*
Caranx talamparoides, *Bl. Schn.*
fallax, *Cuv.* ix. 95.
heberi, *Benn.* •
speciosus, *Cuv.*
†*Chorinemus moadatta*, *Cuv.* viii.
Trachynotus ovatus, *Cuv.*
Psettus rhombeus, *Cuv.* vii.
Plantax vespertilio, *Cuv.*
raynaldi, *Cuv.* vii. 219.
†*Equula filigera*, *Cuv.* x. 92.
dacer, *Cuv.*
Gazza minuta, *Bl. Schn.*
†*Xiphias gladius*, *Linn.*
Histiophorus immaculatus, *Cuv.* viii.
295.
†*Gobius pavoninoides*, *Bl. Schn.*
oligolepus, *Bl. Schn.*
• *giuris*, *H. Buchan.*
†*phaopilosoma*, *Bleek.*
†*cyanomos*, *Bleek.*
†*bonti*, *Bleek.*
†*phaiomelas*, *Bleek.* •
†*tentacularis*, *Cuv.*

- †*Gobus microlepis*, *Bleek*.
grammepomus, *Bleek*.
Apocryptes madurensis, *Bleek*.
Periophthalmus kœlreuteri, *Cuv.* xii.
papilio, *Cuv.* xii. 190.
Eleotris nigra, *Cuv.* xii. 233.
sexgutta, *Cuv.*
Antennarius marmoratus.
Salarias marmoratus, *Cuv.* xi. 305.
quadricornis, *Cuv.* xi. 329.
†*alticus*, *Cuv.* xi. 339.
• *Tenuthis javus*, *Cuv.* x. 118.
nuchalis, *Cuv.*
nebulosa, *Cuv.* x.
Acanthurus triostegus, *Cuv.*
nigrofuscus, *Cuv.* x. 214.
lineatus, *Cuv.* x. 223.
Tennentii, *Gun.*
delisianus, *Cuv.*
ctanodon, *Cuv.*
xanthurus, *Blyth*.
melas, *Cuv.* x. 241.
Naseus unicornus, *Cuv.* x. 259.
brevirostris, *Cuv.* x. 278.
tuberosus, *Cuv.* x. 290.
†*Anabis scandens*, *Cuv.* vii.
oligolepis, *Bleek*.
Polyacanthus signatus, *Cuv.* vii.
Atherina duodecimalis, *Cuv.* x. 458.
Mugil planiceps, *Cuv.* xi. 122.
†*Kelaartii*, *Gun.* iii. 429.
Ceylonensis, *Gun.*
†*troschillii*, *Bleek*.
Ophiocephalus Kelaartii, *Gun.*
striatus, *Cuv.* vii. 417.
marulius, *Cuv.*
Channa orientalis, *Bl. Schn.*
†*ceyprinoides*, *Gun.*
• *Mastacembelus armatus*, *Cuv.* viii.
458.
†*rhynchobdella*, *Cuv.*
Amphiprion Clarkii, *Cuv.*
Dascyllus aruanus, *Cuv.*
Glyphidodon celestinus, *Gun.*
septemfasciatus, *Cuv.* v. 463.
Brownriggi, *Cuv.* (*Chatodon*, *Benn.*)
†*Chellinus chlorurus*, *Cuv.* xiv.
†*Sparus decussatus*, *Benn.*
Julia Ceylonicus, *Benn.*
marginatus, *Cuv.* xiii.
Julis meniscus, *Cuv.*
purpureo lineatus.
†*amlycephalus*, *Bleek*.
†*melanoptera*.
• †*trilobata*, *Lacep.*
bimaculatus, *Benn.*
dorsalis, *Cuv.*
Finlaysoni, *Cuv.* xiii. 471.
gomphosus cœruleus, *Cuv.* xiv. (*G.*
viridus, *Benn.*)
†*tricolor*, *Renard*.
fuscus, *Benn.*
Coris formosa, *Benn.*
cingulum, *Cuv.*
Plostos lineatus, *Cuv.* xv. 118.
†*Callyodon carolinus*, *Cuv.* xiv.
Scarus harid, *Cuv.* xiv.
†*Etroplus suratensis*, *Cuv.* v. 486.
maculatus, *Gun.*, Ann. N.H. 1866.
†*Solea vulgaris*.
†*ceynaptura*.
cinerascens, *Gun.*
†*Clarias teysmanni*, *Bleek*.
†*brachysona*.
†*Saccobranchis microps*, *Gun.*
†*microcephalus*.
Callichrous Ceylonicus, *Gun.*
†*Bagrus albilabris*, *Cuv.*
†*tengara*, *Cuv.*
†*Arius Dussumierii*, *Cuv.*
†*Boakii*, *Gun.*
†*Layardii*, *Gun.*
†*Belone cancila*, *Cuv.* xviii.
†*Hemirhamphus limbatus*, *Cuv.* xix.
44.
†*dispar*, *Cuv.*
Reynaldi, *Cuv.*
Exocoetus evolans, *Cuv.*
†*Dussumierii*, *Cuv.* ix. 138.
†*solandri*, *Cuv.*
†*mento*, *Cuv.*
†*altipennis*, *Cuv.*
†*Rohita Dussumierii*, *Cuv.*
†*Crossochillus reba*, *Ham., Buch.*
†*Garra Ceylonicus*, *Bleek*.
†*Barbus spilurnus*, *Gunth.*
†*plenrotania*.
†*longispinis*, *Bleek*.
†*tetraspilus*, *Gunth.*
†*Layardi*, *Gunth.*

†*Barbus Cumengii*.
 †*nigrofasciatus*.
 †*bimaculatus*.
Leuciscus dandia, *Cuv.* xviii.
 scalpellus, *Cuv.*
 thermalis, *Cuv.*
 filamentosus, *Cuv.*
 †*Rashora daniconius*, *Gunth.*
Nuria thermalis, *Cuv.*
 †*Leuciscus melettinus*, *Cuv.*
 †*Danio miconema*, *Bleek.*
 †*Elustira Ceylonensis*, *Gun.*
 †*Nemachilus urophthalmus*.
 †*nostostigina*, *Bleek.*
Cobites thermalis, *Cuv.* xviii. 78.
Chirocentrus doria, *Cuv.* xix. 150.
Engraulis Brownii, *Cuv.* xxi.
 faceata, *Cuv.*
Elops saurus, *Cuv.* xix. 365.
Sardinella lineolata, *Cuv.* xx. 272.
 leiogaster, *Cuv.*
 Malabarica, *Block.*
 Malaccensis.
 Neohowii, *Cuv.*
Chanos salmoneus, *Cuv.*
Saurus myops, *Cuv.*
Albula conorhynchus, *Cuv.*
Clupea moluccensis.
Symbranchus marmoratus, *Bl. Schn.*
Anguilla mauritiana, *Benn.*, P. Z. S.,
 1831.
 bicolor, *Bleek.*
Murenichthys vermiformis, *Peters.*

Ophichthys orientalis, *Russ.*
Muraena macrurus, *Bleek.*
Syngnathus Ceylonicus, *Gun.* viii.
 168.
Balistes biaculeatus, *Benn.*
 †*stellatus*, *Lacep.*
 †*niger*, *Mungo Park.*
 †*viridus*, *Benn.*
 †*Ostracion cubicus*, *Block.*
Tetodon sceleratus, *Forst.*
 †*fluvialis*, *Ham.*, *Buch.*
 ocellatus, *Benn.*
 †*hispidus*, *Lacep.*

CARCHARIDÆ.

†*Charcharodon rondeletti*.
 †*Mustelus manazo*, *Bleek.*
 †*Stegostoma tigrinum*.
 †*Scyllium marmoratum*, *Benn.*
 Chiloseyllium indicum.
Pristis antiquorum, *Lath.*
 †*zysron*, *Bleek.*
 †*Raja asperrima*, *Bl. Schn.*
Trigon polylepis, *Bleek.*
Aëtobatis narinari, *Cuv.* Dic. Nat.
 xxxiv. 19, also *Raja narinari*.

In addition to those enumerated here, a number more are entered in Sir E. Tennent's list on the authority of Dr. Gunther, who, he says, made it for him; but they cannot be traced in Gunther's work as Ceylon species under the names given.

CHAPTER XXIX.

CRUSTACEA—MOLLUSCA.

A GREAT variety of *Crustacea*, described by Milne-Edwards, frequent Indian seas (*Vide* list), but few of them have been identified as Ceylon species, although most of them are probably found round its shores, where shell-fish are very numerous. A variety of painted crab (*Grapsus strigosus*), is a small species found about rocks, washed by the surf, which they climb with great facility, and are named from the rich red and yellow markings on their shells. Swimming-crabs (*Neptunus pelagicus*) swim as well as crawl, their hind legs being flattened like an oar, and have very small claws, shaped like cray-fish; they are common both to Ceylon and India, and live on live prey.

A remarkable little crab, of the genus *Gelasimus*,¹ with only one claw, which is larger than its body, is named the "beckoning crab," from the circumstance of its raising the claw with a fancied beckoning gesture towards persons who go near or pursue them, but it does so in order to run. It is very active, and burrows in the sandy shore of the Galle face Colombo, and other similar places round the coast, where they are very common, running along the wet sand close to the surf picking up garbage thrown on the beach.

There are several varieties of true hermit crabs (*Pagurus*), exceedingly small species, who dwell in the deserted shells of mollusca lying along the shore. Another dweller in empty shells is the "pea-crab" (*Pontonia inflata*),² a variety of the Mediterranean (*Pinnotheres veterum*), whose habit of living in

¹ Milne-Edwards, N. H. Crust., ii. 52.

² *Idem*, ii. 360.

the shell of the *pinna* attracted the attention of Aristotle and Pliny. Pea-crabs are exceedingly small, only half an inch in diameter, of a round shape, and light red colour, and are said to be very delicate. They are found in England¹ living in mussel shells.

The ocypode, or sand-crab, is a small buff-coloured species that burrows in dry sandy places some distance inland along the coast, they are very active and run with great rapidity. In the West Indies they attain a considerable size. (*Vide* vol. i., p. 377.)

A variety of the common spiny lobster (*Palinurus*), of great size, variegated with white, is abundant in the markets. There is also a species of lobster named *Scyllarus*, distinguished by its flattened form and absence of antennæ, while those of the spiny lobster are very long. Prawns (*Palaemon seriatus*) are abundant and of large size, forming one of the luxuries of Ceylon.

MOLLUSCA.—Ceylon is exceedingly rich in shells, both marine and land species, and although many descriptions have been given in various periodicals, nothing has yet been done towards a systematic account of them. “It is said that many of the shells described by Linnæus came from the island, of which the great naturalist was unaware. The traffic in marine species has long been in the hands of the Moors, who purchase from the natives all the valuable ones they find and export them to other countries.”²

Chank shell (*Turbinella rapia*), used in India for making rings and bangles for native women, are of two kinds, one being called Patti and the other Pajil; they are cream coloured inside and a muddy brown outside, and only found in the north about Manaar and Jaffna. A writer in the “Asiatic Journal” for 1827, points out a curious circumstance regarding them: “All the shells found by fishermen to the north of a line drawn from a point about midway from Manaar to India are called Patti, distinguished by a flat, short head; while all those found to the south of it are of the sort called Pajil, having long and pointed heads.” The valves of both species

¹ Bell, Brit. Crus., p. 123.

² Tennent, N. H. Cey.

usually open to the left, but occasionally one is found opening to the right, to which an extravagant value has been attached, being sold for its weight in gold. Formerly the chank fishery in the sea between Manaar and Jaffna was a valuable Government monopoly, and nursery for pearl-divers, producing 50,000 dollars (£4,000) per annum, but for some reason not explained fell off considerably. The chank shells are seen moving at the bottom in about two fathoms of water, when the divers plunge after them and bring them up.

The chief supply for many years has been the immense deposit of dead shells discovered in 1821 in the lake and tidal flats of Jaffna, embedded in a stratum of blue mud covered by two feet of water, from whence they were dug out. The deposits in the tidal flats have been exhausted, but they are now obtained in the lake by people wading into it up to the neck, using an iron probe like a boat-hook, having a cross handle at the top, with which they manage to hook and draw them up. A license of one-tenth was imposed by Government for the permission, averaging £250 per annum, the value of shells being £2,500. About 2,000,000 of chanks were obtained annually up to 1863 without exhausting the supply. In 1862 the royalty was raised to one-fifth, with a proportionate increase to the revenue.¹

An oyster, with a semi-transparent shell (*Placuna placenta*), which only lives in brackish water and produces a small seed pearl, is found in the bay of Tamblegam, near Trincomalee, in great numbers, half buried in the mud. The pearls are of little value, but the shells are worth ten shillings per thousand, and are exported to China, where they are used as a substitute for glass in windows. They are very flat and about six inches wide. The fishery is rented by Government to speculators for a small sum. 18,000,000 of fish are said to have been taken in three years.²

Edible oysters (*Ostræa edulis*) are found in several places round the coast, those obtained at Bentotte are the most esteemed. Some are found near Trincomalee of an immense

¹ Report from the Governor, 1864, vol. xxxvii. ; Bertolacci, Ceylon, p. 233.

² Kelaart, Report on the Pearl Fishery.

size, measuring upwards of seven or eight inches across, and are anything but inviting. Pliny mentions the large oysters found in Indian seas.

A very pretty violet *Janthina* floats in calm weather on the sea, its inflated membranes answering the double purpose of a sail and a buoy.

Nudibranchiate mollusca.—Dr. Kelaart, in the *Annals Nat. Hist.*, 1858—1859, describes some splendid specimens of these sea animals found on sea-weed and also swimming in the sea, about Aripo and other places. There are several genera of them, *Pteropoda Eolidæ*, *Tritonæ*, and *Doris*, or sea nymph; they have semi-transparent gelatinous bodies of various shapes, resembling leaves with branches on their sides and backs; *Pteropoda* have wings resembling butterflies, and are all richly coloured. *Doris gloriosa*, Kela.,¹ is a fine specimen of sea-nymph, three inches long, of a rich pink, minutely dotted with red and white.

Teredo navalis is a species of mollusc very destructive to the timbers of vessels in Indian seas, boring holes in them, which are partly lined with shell; they have recently attacked the electric cable in the Persian Gulf. They are a greyish grub-like animal, with a curious forked tail, which enables them to swim, and a horny crescent-shaped mouth.

Land Shells.—Numbers of *Ampullaria*, *Paludina*, and *Unio marginalis*,² are found about the northern tanks, furnishing food for storks and other birds. In the southern provinces especially, trees in some places are covered with varied species of snails in such abundance that the trunks are hid by them. Few are to be seen in the dry season, particularly in March, when they aestivate in various retreats, some in holes under roots of trees, two or three inches below the surface, others in the mud of tanks, until the monsoon brings them forth again. There is no doubt that tropical snails, at least, have the power of suspending vitality for a very long period; a curious instance is given in the *Annals Nat. Hist.* 1850, of a snail (*Helix macularia*), brought from Egypt to England, which remained in this state for four years.

¹ *D. marginata*, Leukart.

² Layard, *Ann. Nat. Hist.*, 1853, p. 225.

The trunks of mango trees about Galle are covered with richly coloured *Helix hæmastoma*, with a red peristome and chestnut and milk-white bands, their fine colours are often obscured by a thick green coating of vegetable substance, probably to hide them from birds. Among other species found about Galle is a very pretty and distinct *Cyclostoma halophilum*, along with the common Indian *Bulimus gracilis*. *B. Zeylonica* is a green mollusc which comes out of its shell, found on the coffee plant eating the leaves. *B. Indica* is a yellow variety, another *Bulimus* is very common on the walls of the fort of Colombo and Jaffna.

Many fresh water and land shells have within recent years been found in the mountains of Ceylon, similar to those of the Himalaya, Nilgherries, and Western India. *Helix Huttoni*, Pfr., of the Himalaya, reappears in the vicinity of Fort Macdonald, 4,500 feet above the sea. *Clausilia Ceylonica*, found in the same place, is allied to the Darjeeling *C. ios*; this is the first species of the genus that has been found in Ceylon, none are said as yet to have been observed in Southern or Central India. The gigantic *Helix basileus*, three inches in diameter, is related to the Ceylon group (*H. chenii*, Pfr.), also allied to Nilgherry forms. *Tanalia stomatodon* has been found at Travancore, South India, the first of the species observed out of Ceylon. Other South India fresh water shells, such as *Bithinia travancoria*, from Quillon, have been found near Badulla; and the *Achatina* land group of Darjeeling are the same type as those of Ceylon, the Mahabaleshwar hills, and Nilgherries.¹ In some forms Ceylon has a generic area of its own, especially among *Cyclostoma*, and the *Aulopoma* are peculiar to the island.²

RADIATA.—Some very large species of *Ophiuridæ*. with arms a foot long, and of a dark purple colour, are to be found at Trincomalee. Star-fish, with rigid rays (*Asterias*, Linn.), and other species, are numerous on the eastern shores.

Planaria.—Fifteen species of Müller's *Planaria*, or flat worms, were described by Dr. Kelaart in the Ceylon J. R. A. S., 1856. Some are found on the bark of trees after rain, also

¹ Benson, Ann. Nat. Hist., 1860, 1862.

² J. A. S. Beng., 1860, 121.

in fresh water; they are classed by some naturalists among *Annelida*. A few of the genera are marine species.

HOLOTHURIDÆ.—Drummond's *Cucumaria*, or Biche de Mer of the French, and trepang of the Malays, is a kind of sea-slug, an almost inanimate creature, with a cylindrical form, and a flaccid, leathery skin, full of water, which it voids when taken out of the sea.

Great quantities of them are found near the shore about Manaar and the north west coast, and when boiled and dried in the sun forms the Chinese luxury called Hoy-shew, from which they make a thick and rich soup. It is largely prepared in the island for export to China, they also obtain it from Malay, and is said to be worth from £1 to £3 per cwt., according to quality.

ACALEPHIA.—Jelly-fish are numerous, especially about the north west coast. The *Physalis pelagicus*, or Portuguese man-of-war, as it is commonly called, is the most charming of the *Acalepha*; they are only found in tropical seas floating on the surface during calm weather. It is not so harmless as it looks, the tentacles sting like a nettle, causing a redness and blistering of the skin, and a dull pain up the arm of any person who incautiously takes hold of it. One of the first persons who has described this animal was Thomas Stevens (*Vide* ch. xiv.), and very accurately. He says: "We often saw a thing swimming on the water like a cock's comb, which they call a ship of Guinea, but the colour is fairer, which standeth upon a thing like the swimmer of a fish, and beareth underneath in the water strings which save it from turning over; this thing is a poison, and a man cannot touch it without great peril."

Zoophytes.—Small fragments of red coral, similar to that of the Mediterranean, have been noticed at the water's edge on some parts of the southern shore between Galle and Colombo, and appears to have been known to the Portuguese, as Ribeyro mentions it;¹ Horsburgh also says there are beds of red coral in seven fathoms of water near Point Pedro. A tulip-shaped sponge, of a bright orange colour, is found adhering to pearl oyster shells at Aripo.

¹ Tennent.

Infusoria.—Parts of the sea off Colombo during the monsoons assume a red tinge, caused by a species of infusoria; a similar appearance has been noticed at Bombay, which a writer in the Ann. Nat. Hist., 1858, says is caused by a red animalcula named Peridium; in its early stages of existence it is a green colour, containing a substance identical with chlorophyll of plants, ultimately an oil appears in them, when the green hue disappears, and red takes its place, which lasts only a few days.

LIST OF CRUSTACEA.

- | | |
|--------------------------------------|------------------------------------|
| Eucypodius Latriellia. | Dorippe quadridentata, <i>Fab.</i> |
| Egeria indica, <i>Leach.</i> | sima, <i>Fab.</i> |
| Herbstii. | camard, <i>Fab.</i> |
| Doclea ovis, <i>Herbst.</i> | Droma caput mortuum, <i>Latre.</i> |
| maricata, <i>Herbst.</i> | Rumphii, <i>Rump.</i> |
| hybridæ, <i>Fab.</i> | Scyllarus orientalis, <i>Fab.</i> |
| Paramithrax Peronii. | Palinurus sulcatus. |
| Halimus auritus, <i>Latre.</i> | penicillatus. |
| Lambrus carenatus. | dasypus. |
| Thalamita admete, <i>Herbst.</i> | ornatus, <i>Fab.</i> |
| Neptunus pelagicus, <i>Linn.</i> | Ranina dentata, <i>Rump.</i> |
| sanguinolentus, <i>Herbst.</i> | Pagurus affinis, <i>Edw.</i> |
| Sesarma tetragona, <i>Fab.</i> | punctulatus, <i>Oliv.</i> |
| Cyclograpsus punctatus. | miles, <i>Fab.</i> |
| Ocypoda Lævis, <i>Fab.</i> | custos, <i>Fab.</i> |
| ceratophthalmus, <i>Pall.</i> | Alpheus Tanulus, <i>Fab.</i> |
| macrocera, <i>Edw.</i> | Palæmon carcinus, <i>Fab.</i> |
| brevicornis. | Pontonia inflata, <i>Edw.</i> |
| Gelasimus annulipes, <i>Latre.</i> | Stenopus hispidus, <i>Seba.</i> |
| Macrophthalmus incisus, <i>Rump.</i> | Penaus indicus, <i>Fab.</i> |
| emarginatus. | monodon, <i>Fab.</i> |
| Grapsus messor, <i>Forsk.</i> | brevicornis, <i>Fab.</i> |
| strigosus, <i>Herbst.</i> | Squilla scorpion, <i>Latre.</i> |
| Plagusia depressa, <i>Fab.</i> | microphthalma, <i>Fab.</i> |
| squamosa, <i>Herbst.</i> | Gonodactylus chiragra, <i>Fab.</i> |
| Calappa lophos. | Tamaris scyllarus, <i>Rump.</i> |
| fornicata, <i>Rump.</i> | Penaus crassicornis, <i>Fab.</i> |
| Varune litterata, <i>Fab.</i> | Phyllosome communis, <i>Leach.</i> |
| Leucosia craniolarius, <i>Linn.</i> | Indica, <i>Fab.</i> |
| Arcanie crinaceus, <i>Herbst.</i> | laticornis, <i>Fab.</i> |
| Philyra scabriuscula, <i>Fab.</i> | Reynaudii, <i>Reyn.</i> |
| porcellans, <i>Fab.</i> | |

The following families and genera of shells are found in Ceylon ; a more detailed list would be beyond the scope of this work ; many have more than one name.

conus	melania	chemnitzia
ovulum	paludomus	cardium
cyprea	purpura	cardita
voluta	planorbis	arca
marginella	cyclostoma	pectuncula
terebra	clausilia	nucula
oliva	pupa	mytilus
ancillaria	columbella	loligo
emarginula	achatina	ranella
stomatella	limax	malleus
eburna	tanalia	pyrula
buccinum	helix	cancellaria
harpa	vitrina	fusus
cassis	phasianella	pirena
strombus	halotis	bithinia
triton	patella	Thwaitessi
pleurotoma	navicella	aulopoma
fasciolaria	hyalaea	chiton
nassa	dentalium	solarium
auricula	lamellaria	calyptrea
turbinella	parmacella	vaginula
mitra	terebellum	streptaxis
cerithium	ostrea	bulimus
dolium	placuna	succinea
nerita	pectin	auricula
meleagrina	avicula	pythia
sanguinolaria	pinna	truncatella
solen	lithodomus	tomatella
rotella	anatina	pyramidella
pandora	antinella	pterochera
spondylus	lutraria	murex
natica	blainvillia	bullia
phorus	serobicularia	venus
lima	mactra	littorina
pholas	mesodesma	valvata
delphinula	crassatilla	neritina
turbo	amphidesma	trochus
teredo	spirula	cylindrella
vulsella	sepia	conovulus
siliquaria	galeomma	cyclophorus
planaxis	kellia	catulus
aspergillum	petricola	bullia
lingula	psammobia	unio
phos	helicarion	melo
janthina	tellina	chione
turritella	lucina	monodonta
ampullaria	donax	
paludina	cyrena	
ricinula	cytherea	

CHAPTER XXX.

PEARLS AND THE PEARL FISHERY.

PEARLS have at all times been considered one of the most valuable commodities of the East, forming an indispensable part of the decoration of Hindu princes. The necklace taken from the Raja Jaipat, when he was captured by Mahmud, in the year A.D. 1001, was valued at £100,000. A string of pearls ornamented the neck of Tippoo Sahib when he fell at the storming of Seringapatam, and Marco Polo speaks of the pearl collar worn by the King of Mabar. Twenty-two and a half centuries before our era they are said to have been named as a tribute in China, and are mentioned at a later period in the "Rh-ya," the most ancient of dictionaries. The Emperor Wuh, B.C. 140 years, sent envoys to India to obtain them, and Chinese books speak of one from Ceylon of great size.¹

It is remarkable that so prized an ornament should be rarely, if ever, mentioned in the Talmud, which so often alludes to other gems worn by mankind. According to Dr. Kitto's "Bible Cyclopædia," the word "gabish," (rendered pearl in Job xxviii. 18), means crystal; they are, however, repeatedly mentioned in the New Testament. Pearls were valued at Rome and Alexandria as highly as precious stones. Pliny is eloquent about the luxury of pearl-wearing among Roman women, "who had numbers of them dangling from their ears and fingers, and their sandals were embroidered with them; a pearl worn by a woman in the public streets was as good as having a licitor walking before them, it inspired such awe from the populace," (ix. 56). The wife of A. Caius had £304,000

¹ J. R. A. Soc., xvi. 280.

worth of pearls and emeralds; Servilia,¹ the mother of Brutus, received from Cæsar a pearl worth £50,000, and Cleopatra's ear-rings were valued at £161,000, one of which she drank after dissolving it in a cup of vinegar at a banquet, to win a bet from Marc Antony.² This exploit is considered by some to have been nearly impossible, if not dangerous, as it would require a very strong acid to dissolve a pearl. Others suggest she may have used some acid whose nature is unknown to us, or, perhaps, she broke and pounded the pearl to powder previous to dissolving it in the vinegar, afterwards diluted with water, in order that she might drink it.³

Pausanias and Vitruvius both remark that pearls could be dissolved in vinegar, and drinking dissolved pearls was not uncommon in Rome during the Empire, being practised by Caligula, and the dissipated Clodius is said to have given each of his guests a pearl dissolved in vinegar. Electuaries made of seed pearls, occasionally mixed with small precious stones pounded into powder, are used in India and Ceylon at the present time, being highly valued on account of their supposed stimulating properties, but this must be imaginary; pearls are composed of 87 per cent. of carbonate of lime and eleven of organic matter, and can be of little value as a medicine. Seed pearls are also made into the lime used by rich natives for chewing with their betel. Pounding pearls (*perle da pestare*) are mentioned by Pigolotti as being sold at Constantinople in the fourteenth century, evidently to be used in medicine, and Mattioli quotes from Avicenna, G. Da Uzzano, and others, that pearls are good in palpitations and watery eyes.⁴

The largest pearls that have ever been found came from St. Margarita, in the West Indies, and the island of Tylos near Bahreen, in the Persian Gulf, a renowned and important fishery existing from a period anterior to the time of Alexander the Great, being mentioned by Nearchus (B.C. 320). The Sheik of Bushire, to whom it belongs at present, is said to derive a revenue of more than £200,000 from it. Accord-

¹ Rollin, iii. 91.² Macrobius, Saut., l. iii. cxvii. 17.³ Beckman, Hist. of Inv., ii. 1.⁴ Cathay, ii. 305.

ing to Tavernier, the most perfect pearl ever discovered was bought, in 1633, by the Shah of Persia for the sum of 1,400,000 French livres from an Arab, who brought it from Catifa, a fishery opposite to Bahreen. He also speaks of another Bahreen pearl belonging to the Prince of Muscat: it was twelve carats in weight, nearly round, and so bright and transparent one could almost see through it: he offered 40,000 crowns for this unique gem but was refused.¹ Pigafetta (1519) says, the king of Borneo had two pearls the size of pullet's eggs, so perfectly round they would roll off a table.

Ceylon pearls are said to be whiter than the Persian, but more irregular in shape and generally considered inferior, rarely attaining a very large size. Le Beck mentions that the largest pearl taken at the fishery of 1797 was the size of a pistol-bullet. Ralph Fitch says, the Ceylon pearls were not so round as those of Bahreen, which were the finest in the world.

Besides the fisheries named, there is one at Tutocorin, belonging to the Indian Government, at the Soolu islands near Singhapur, and on the coast of Algiers. The true pearl oyster is not the only shell-fish that produces pearls, being occasionally found in various other species. According to Pliny (ix. 57) and Ælian (xv. 18) pearls were obtained by the Romans from Britain 2000 years since. The English pearl is a species of mussel (*Unio margaritifera*), they are seldom sought for now in England, but occasionally a fine one has been found. One that was obtained from Conway, in Wales, holds a place in the Crown of England.² The Chinese obtain pearls from a species of horse-mussel (*Dipsas plicatus*), also called the *Mytilus cygnus*, or swan-mussel. They are also found in the sea-hare (*Alphius*), and in the common oyster (*Ostræa edulis*). Dr. Karl Möbus of Hamburg (1857) mentions that a citizen of that town narrowly escaped swallowing one valued at £3. Brown pearls are found in the *Pinna nobilis*, green and rose-coloured in the *Spondylus galearopus*; violet in the *Arca Noë*, and purple in the *Anomia cepæ*.

The earliest mention of the pearl fishery of Ceylon is found

¹ Trav., ii. 324.

² Forbes and Handley, Brit. Moll., ii. 147.

in the "Rajavali" chronicle (B.C. 806), being at that time near Colombo, and destroyed by an inundation of the sea. The Tutocorin fishery on the Indian coast, opposite to Aripo, is noticed in the "Vishnu Púrana." Pliny mentions the Ceylon fishery, saying, "The Indians seek for pearls in the island of Taprobane, which is the most productive of them; also at Perimula, a promontory of India, but those of the Persian Gulf are the most valued" (ix. 54). Ælian (xv. 8) repeats his remarks, only he says the Indian pearls were the best. Perimula has been placed by some geographers in Malay, but Pliny evidently referred to the Tutocorin fishery. Ælian calls it an Indian city. There is a place now called Palamutha near Cape Comorin.

Pliny mentions that the word "Margarita" was of Indian origin: it is probably derived from the Sanscrit *Margata*, meaning anything prized or sought after. In this language pearls are called "mutya," and "manigana" many pearls—"mani" is also a general term for a gem. Including pearls. The Hindus call them "moti," and the Sinhalese "mutu."

Marco Polo gives an account of diving for pearls in what he calls the kingdom of Mabar, yet the position indicated seems to refer to Ceylon, he says, "first they go to a place called Bettelar, and then sixty miles into the gulf." Aripo has generally been the central point of the Ceylon fishery. By Bettelar he may have meant Batthalah, where Ibn Batuta landed. Sometimes the site has been as low down the coast as Chilaw:¹ during the Dutch period the best fisheries took place there. Sir E. Tennent says, "the Tamils call Chilaw 'Salabham,' or the sea of gain" (i. 440). Stevens, in his "History of Persia," says Chilaw means a fishery (p. 402).

Marco Polo says the persons permitted to fish gave the king of Mabar, who owned the fishery in his time, the tenth part of the produce as a tribute, and one-twentieth part to the "Abraim," or enchanters of the fish, meaning the sharks; but adds, "Their charms hold good only for the day, as at night they dissolve the charm so that the fish can work mischief at

¹ Cordiner says there was a small fishery at Chilaw in 1803, which produced £15,000, ii. 73.

their will." By "Abraim" Marco doubtless meant the Brahmins, but they do not charm sharks now, although they may have done so in his time. The manner of diving was similar to that practised at present. He says, "after mid-May the fishery ends, but in other parts, 300 miles distant, they fish until September or October." The site of this distant fishery has not been ascertained. Newhoff mentions, when he visited India (1612), that they fished in October at Tutocorin.

Although some of the kings of Ceylon have styled themselves "Lord of the Pearl-fishery," they appear to have in reality never possessed any power over it, which may have been caused by the early conquest of Jaffna, and the northern part by the Malabars. Several travellers mention the claim of Indian and foreign rulers to it. Ibn Batuta says, Aryia Shakarte, a piratical potentate ruling the north-western coast, claimed it when he was in Ceylon. The Portuguese paid a tribute, for permission to fish in peace, to the Naique of Madura; and Padre Barretto mentions that "they were also obliged to guard it with a regiment of Christian Parawas from the hostility of the king of Kandy. The Naique of Madura had one day's fishing each week as his tribute."¹

The Dutch were much annoyed by the Malabar chiefs, and the Nabob of Arcot, who refused to allow the divers to go to them unless they were subsidized, and many times abandoned the fishery on this account. Their troubles were chiefly caused from having abandoned their old ally, the Raja of Marwar, when he was attacked by Mahomed-Ali-Chan, Nabob of the Carnatic, after which he was unable to help them.²

When the British obtained possession of the island, the petty princes of Madura tried to enforce their claims on the government, and some of the Southern Indian Pagodas, along with that at Ramiseram, also demanded a tithe of the oysters taken, producing old grants on copper-plates where the privilege was inscribed. For some years this claim, which yielded them about £2,700 per annum, was allowed, but eventually withdrawn in 1839.³

¹ Relation, p. 248.

² Haafner, p. 362.

³ Stewart, Mem. and Appen.; Lee's Ribeyro.

Revenue derived from the fishery.—There are no records giving any account of what the Portuguese, or those who preceded them, derived from pearls. According to some returns in the appendix to Lee's *Ribeyro*, the total Dutch revenue from the fishery during their occupation amounted to about £200,000. Since the British domination it has averaged from £35,000 to £40,000. In 1797, an exceptional year, it produced £150,000, and in 1837, one of the worst, only £10,000. The total sum received from 1796 to 1837 amounted to £828,381, and from 1857, when the fishing was resumed, to the present year, the sums received have been :—

1857	.	.	.	.	.	.	.	£20,309
1858	.	.	.	.	.	.	.	24,120
1859	.	.	.	.	.	.	.	48,216
1860	.	.	.	.	.	.	.	37,512
1863	.	.	.	.	.	.	.	51,010
1864	.	.	.	.	.	.	.	51,017

The expense of maintaining a guard over the banks to prevent poaching was estimated some years since at £850 per annum, which during the twenty years there was no fishery, was a loss to government of £17,000. During the S.W. monsoon, when the surf is high on the coast, the watch is performed on shore at Kudremalee, and at other times of the year by a vessel in the offing. It was first established in 1811.

The various banks of rocks and coral ridges along the coast where the fish usually resort are examined about November of each year, and samples sent to Colombo to enable the government to decide if there should be a fishery, in which case the permission is sold to speculators by public auction. Persons experienced in the business profess to be able to judge from the appearance of the shells and pearls found in them, what the fishery would be likely to yield. They are, however, sometimes deceived in their calculations, and lose heavily. In 1804, a bad year, the government remitted one-third of the money to the renter. The purchasers of the fishery are generally Moors, Tamils, or Banian merchants. In 1857, owing to a combination among the Chettie speculators, the fishery only yielded £20,309, although an enormous quantity

of oysters were landed, and the government threatened to close it.¹

Natural history of the pearl-fish.—The Hindus, usually poetical in their ideas, describe pearls as drops of dew from heaven, falling into the shells when the fish rise to the surface of the ocean. A similar notion appears to have been also entertained by the Greeks and Romans. Pliny (ix. 54) says pearls were at first a liquid, and Ælian that they were caused by lightning. Abu Zaid remarks, some authors maintain when it rains the shell-fish rise to the surface of the sea and, opening their mouths, receive the drops afterwards transformed into pearls, while others think they are engendered in the fish itself.² Edrisi is very positive about their being produced by rain, and Benjamin of Tudella, the Jewish Rabi who visited the Bahreen fishery in the twelfth century, varies it by saying they are formed from drops of April showers; repeated by Newhoff, a Dutchman in 1612, who states if the fish were taken and opened before June the pearls would be found soft and pliable like pitch!

Although some of the divers to the present day believe in this origin of the pearl, it is of course quite fabulous, the general opinion among naturalists being that they are morbid secretions stimulated originally by some foreign substance gaining admission into the shell—such as a grain of sand, an idea first suggested by Reamur in the beginning of the last century.³ Pearls are secreted by the fish in exactly the same manner as the nacre of the shell, and are in fact the same substance formed into a globular shape, disposed in concentric layers, giving that unique and peculiar transparency so highly prized. If a small pearl is cut in two it presents to view a series of layers like an onion, and there is often a foreign substance in the centre.

Some naturalists say pearls are not the result of disease, but “simply independent natural concretions growing in the fish.” In opposition to this theory, it may be stated that they are rarely found when the flesh of the fish presents a healthy

¹ Report of Governor, xxi. 143.

² Voy. Arabes.

³ Mém. of the French Academy, 1712.

appearance, or in a state to be eaten by the natives, who occasionally use them as food ; also, a large proportion of the fish do not contain any pearls at all. Dr. Kelaart has shown that they are often formed from ova of the fish itself, which escape through the coats of an over-grown ovaria, and, getting into the interstices of the mantle, become the nucleus of pearls — an origin that was suggested by Sir C. Home in the “Philosophical Transactions” for 1826. Von Hessling, of Leipzig, who published in 1859 an elaborate treatise on the subject, examined 40,000 *Unio margaritifera* of Bavarian waters, and some hundreds of oriental pearls opened with a chisel, and could find no trace of a parasite or foreign origin in them. Dr. Möbus, however, has arrived at an opposite conclusion ; in eight pearls from America which he examined, he found the remains of entozoa in the nucleus, tracing their origin to the eggs of parasitic animals, gaining admission inside the shell. He quotes a statement from Valentin that a Swedish major and a Livonian noble saw a small shell-fish crawl out of a pearl which a fisherman placed on a table before them. Buffon was of opinion they proceeded from a natural tendency to a superabundant secretion of nacre to provide against accidents to the shell. Minute boring *Annelidæ*, we know, perforate them in all directions, these holes in the shells being filled up with the nacre. Whenever the shell is free from their attacks the nacre may find a vent in the formation of pearls.

Sir Alexander Johnson more than seventy years ago suggested to the Home Government that a naturalist should be sent to Ceylon to investigate into the habits of the pearl-fish from which the colony derives so large a revenue, but nothing was done until about 1848, when the government of Ceylon, stimulated by the failure of the fishery during the ten previous years, obtained an aquarium and microscopes from England, and appointed Dr. Kelaart as naturalist, who published the result of his observations in 1848, which shows that the habits of the pearl-fish differ little from other *Conchifera* of the same genus.

One-third of the fish died from the force required to remove

them from their native beds, being conveyed from Aripo to Colombo in wooden boxes full of holes toyed at the stern of a vessel;¹ besides those in the aquarium he placed some in wooden boxes, finger-glasses, an old canoe, and an earthen vessel which they seemed to like best, and also established a colony of them at Trincomalee, from which the Doctor thought artificial beds might be planted in any part of the island, but it is very doubtful if they would answer. There is nothing to prevent the fish migrating of their own accord to other places on the coast besides the positions they habitually select, being probably influenced by their food; and nothing seems to have come of the colony at Trincomalee. (See page 289.)

The mollusc, known as the pearl-oyster, although it bears a resemblance to the edible oyster, being chiefly distinguished by a broad hinge, belongs more to the mussel tribe, particularly as it has, like the mussel, a byssus or cable by which it attaches itself to foreign bodies. Lamarck separated the pearl oyster which he named *Meleagrina margaritifera* from the old genus *Avicula*, of which there are several species in Ceylon, some producing valueless pearls of a dark colour. The true pearl-fish attains a much larger size in America and the Persian Gulf than in Ceylon, where the shells are rarely more than six or seven inches wide.

On removing the animal from the shell the whole of the internal parts are found enveloped in a membrane or "mantle," along the edges of which at the opening are a double set of fringes formed of hairy tentacles or filaments which dovetail into each other, one set being in immediate contact with the shell. So excessively sensitive are they to the vicinity of a foreign body, that if a feather be pointed near an open shell it immediately closes, and they were observed when in the aquarium to close at the approach of the hand, or even the shadow of a person on the sides of the glass." Dr. Kelaart was of opinion they have no organs of sight, "the sensitiveness of the membrane taking their place," and may be a power analogous to

¹ Mr. North, in 1803, and Captain Stewart some years after, both tried unsuccessfully to convey live fish from Aripo to Colombo, J. R. A. S., iii. 454; Cordiner, ii. 44.

that possessed by the wing of the bat. The investigations of naturalists have discovered supposed organs of sight in the scollop which may also exist in the pearl-fish. The edges of the mantle are found to be studded with a number of pearl-like points interspersed among the tentacles considered by M. Poli to be so many eyes, constituting a perfect "Argus;" and the researches of M. Siebold have demonstrated the existence of another sense in mollusca, that of hearing situated in the foot.¹ Le Beck imagined two small blue spots which he discerned in the foot of the pearl-fish to be eyes.

"Were it not for the sensitive fringe of the mantle, the soft part of the fish would soon become the prey of a host of carnivorous creatures in the sea; it also plays an important part in the secretion of the pearly nacre of the shell, for when it is injured this substance is not formed in such abundance, and the edges of the shell become jagged and lose their brilliancy; also if the edges of the membrane become retracted and do not fit close to the shell, grains of sand or the larvæ of insects gain admittance between them, becoming the nucleus of a pearl, being immediately covered with the pearly secretion which is always going on, augmented at the part where the foreign substance lies."²

The pearl-fish feeds on animalcules, minute shells called *Foraminifera*, and those algæ or vegetable forms found growing on shells, so minute as to require the aid of a microscope to detect them; and may be said to carry its food on its back.

The foot is a long brown member coiled up when at rest, in a corner of the shell; in structure it closely resembles the tongue of a quadruped, and when protruded from the shell enables the fish to move from one place to another by a snail-like motion, or form a byssus. "The foot of *Conchifera* is used for various and widely-different purposes; in the cockle locomotion is accomplished by a spring, the foot being bent against a firm substance, when the recoil jerks the fish forward. The *Solen* uses it to bury itself in the sand, and the *Pholas* and *Teredo* excavate with it holes in solid rock and timber, where they pass their lives." The byssus is composed of a

¹ Jones, Ani. King., p. 542, ed. 1871.

² Kelaart.

number of fine filaments, formed from a secreting gland in the underpart of the foot, being as it were spun from the fish, as the threads of a web are formed by a spider. When the fish wishes to fix itself in any position it takes a fancy to—a rock, for instance, the foot is pushed forward and the point rested on the rock for a few minutes and then withdrawn, leaving a fine thread behind attached to the rock. This operation is repeated until a sufficiently strong cable is formed; in some large shells upwards of fifty such fibres have been found chiefly near the hinge of the shell. The fibres are at first quite white, but in a few days become of a green colour, and look like hairs.

“The pearl-fish cannot detach the byssus from the rock to which it is fixed, but it has the power of casting off the other end attached to its own body, and, like a ship, slip its cable, in order to seek a more favourable place and form another byssus.” In the aquarium they move about chiefly at night, and Dr. Kelaart says “they sometimes perform this operation twelve times in a month,” being in early life to some extent a necessary part of their economy, as old oysters are not so active in forming the byssus. In their native beds the byssus begins to break and they fall away from the rocks and die off, either from old age or some other cause after six¹ or seven years, in which case the pearls in them are lost. Cordiner mentions that in 1804 a bed of large oysters was accidentally discovered, the greater part of them being dead.² According to the native divers there are male and female pearl-fish, and they profess to be able to distinguish them by their shells—the large flat ones being males and the concave shells females. but Dr. Kelaart failed to detect any difference in them, and Le Beck came to the same conclusion. Like most *Conchifera* they appear to be monœcious, and in spawn from March to June. Their prolificness is extraordinary; from calculations made with a micrometer the number of eggs in the ovaria of a fish five or six years old cannot be less than 12,000,000, nature having made ample provision against the species being exterminated, either by the avarice of man or its natural enemies.

¹ Stewart, Mem. p. 7.

² Vol. ii. 46.

The spawn at first floats in coagulated masses on the sea, the sport of wind and waves, until the shell forms, and it acquires sufficient weight to sink to the bottom,¹ but it has been found attached to a wooden buoy which was covered with young fish the size of a shilling. The fact of the spawn floating on the sea did not escape the observation of Abu Zaid, who remarks "that it was found adhering to the sides of the diver's boots."² The fish comes to maturity in six or seven years increasing about one inch each year. It is only after they have attained their fifth year that pearls found in them are of any value, the older the shells and the more they are covered with a calcareous crust the better. The number found in a shell varies considerably—sixty-seven have been taken from one, but this was a rare circumstance, as the majority contain none. The best pearls are generally found in the fleshy part of the fish near the hinge. Some of the shells have a deep red tinge inside, and are called betel pearls by the natives. The divers say when pearls have been a long time in the fish they vomit them out, finding them disagreeable.

Migrations of the pearl fish.—At the failure of the fishery in 1837 it was stated by a factious party in the colony "that the Government had allowed the banks to be over-fished and ruined in order to increase the revenue;" but this was erroneous, the real cause being most probably that the fish migrate at times from their usual habitat to some other place, without leaving any clue to their whereabouts. There is still a good deal of mystery to be cleared up on this point, Dr. Kelaart's work giving little information on the subject. The divers attribute their disappearance to various causes, such as currents in the sea burying them in sand, which is swept over them, want of rain, and devouring fish. They have many enemies, being eaten by chanks and other fish. Ten pearls were found in a species of sun-fish, caught by the sailors of the *Wellington* man-of-war guarding the fishery;³ and quite recently a new enemy has appeared in the gigantic ray

¹ The spat of the eating oyster acquires a shell in twenty-four hours.

² Voy. Arabes.

³ Stewart, Mem., p. 9.

Raja narinari), which does not seem to have been previously noticed. According to accounts from the colony given in the (daily papers these rays have invaded the fishery, destroying all before them, being discovered at the autumnal examination of the beds in 1872. Perhaps these were the fish which Pliny (ix. 2) says "the pearl divers had contests with." His description could not apply to sharks, which the divers will not venture near, and the rays may be the old enemy come back again. The pearl fish do not entirely abandon their usual habitat, there being always more or less of them to be found about it, although often so few, or too young, to pay the expense of a fishery.

The migrations were known to the Arabians many centuries since, and their statements on the subject are quoted by M. Reinaud in his "*Mém. sur l'Inde*." Albyrouni, who lived in the eleventh century, mentions that in his time "the Ceylon fishery was suddenly exhausted, while at the same time one was formed at Sofala in Africa, and people were persuaded that the shell-fish transported themselves from one place to another."¹ It seems, however, improbable that they could move so far over the bed of the ocean, although the spawn when floating on the sea might be carried by winds or currents to some distance before it sinks to the bottom.

A fishery was formed at Trincomalee in 1750, the only instance on record of their having selected that locality.² Alexander of Rhodes, a Jesuit missionary in Southern India, 1610, remarks the coincidence of "the fish having left Tuto-corin along with the Jesuits, and their not returning until after the Fathers came back to their old mission, from which they were absent some years."³ It does not appear to have been remarked that the Bahreen fishery is subject to similar migrations.

¹ "Les pêcheries des perles ont des moments d'intermittence. Albyrouni rapporte que de son temps la pêche de la mer de Ceylon s'était tout-à-coup épuisée, et qu'il s'en était formé une autre à Sofala en Afrique. On était persuadé que les coquillages s'étaient transportés d'un lieu dans un autre."—*Mém.* p. 228. In his *Frag. Arabes*, Reinaud gives a slightly different rendering of this passage.

² J. R. A. S., iii. 456.

³ *Hist. des Voy.* xi. 353.

During the Dutch occupation of Ceylon, a period of 140 years, the failures in the fishery amounted to sixty, viz., from 1656 to 1666, from 1732 to 1746, and from 1768 to 1795, and altogether they had only four good years, three of them following each other, from 1747. Since the British obtained the island it failed from 1820 to 1828, and from 1837 to 1859, besides various shorter periods and bad years.

An idea appears to have prevailed in the colony that the pearl oyster was incapable of voluntary movement, which is the more strange as it was well known long ago that this was a habit of all the conchifera, who are furnished by nature with a foot and the means of forming a byssus. Forbes and Handley, in their *British Mollusca*, ed. 1843, say, "All animals of the *Ariculaceæ* genus have mantles freely open, and a small foot with a powerful byssiferous gland" (ii. 251). The locomotive powers of the pearl-fish in particular were known to Reaumur 170 years since, and Le Beck, who visited the fishery at the end of the last century, remarks, "I have not the least doubt it has locomotive powers, using for this purpose its tongue; this conjecture is strengthened by the observations of Reaumur, who found that this body serves them as an arm or a leg to move from one place to another. Though the divers are very ignorant of the economy of the pearl-fish, this change of habitation has been long since observed by them; they allege it alters its abode when disturbed by an enemy or in search of food."¹ Cordiner also states "that he placed a number of young fish having the appearance of sand on the glass of a microscope, when they were seen to strike out a beard and move along with incredible ease and rapidity" (ii. 44).

Artificial pearls.—The Chinese have for many ages practised an ingenious way of growing pearls in the fish themselves—taking advantage of the fact that they deposit nacre on sub-

¹ *Asiat. Researches*, 1799, v. 1079. "Les conchifères non fixés sont ordinairement munis d'un pied charnu beaucoup . . . comme les moules, secrètent une substance cornue élastique, tantôt en masse compacte, tantôt en fils plus ou moins déliés, qu'on nomme leur byssus; ils se fixent par ce moyen, mais ils conservent la faculté de changer de lieu en abandonnant l'ancien byssus à mesure qu'ils en portent plus loin au nouveau."—D'Orbigny, *Dict. Nat.*, Paris, 1846, viii. 283.

stances introduced into their shells, they manage in some way to drop or insert small beads of mother of pearl into them, and after a time they are found considerably increased in size, being regularly covered over with the pearly substance. The Chinese also make little pearl-covered images of Buddha by stamping out a rude figure in thin metal and introducing them into the shells. In the account of the voyage of the "Novara" (i. 388), it is stated "that the Topographia Is-chi-Kiang speaks of a pearl figure of Buddha which was sent to Peking 490 B.C." There seems to be some error here about the date, as the Chinese could have known nothing about Buddha at that time; however, there is no doubt the art, like everything else in China, is very ancient.

Philostratus, in his life of Apollonius of Tyana, mentions that the Indians manufactured pearls from the living fish by pricking them with a sharp pointed instrument, "receiving the liquid that flowed from the wounds into small holes in an iron plate." This account is supposed to be a fiction, and probably refers to the Chinese method. Linneus, in 1761, is said to have proposed to make pearls by boring holes in the fishes' shells, which they would fill up with their secretion.

In Europe the idea of making imitation pearls originated in Venice, about the beginning of the sixteenth century, by covering balls of wax with an amalgam of quicksilver, subsequently improved by Jaquin, a French glass-bead maker, who scraped the silvery scales off a small fish called Ablets by the French (*Leuciscus alburnus*), and made from them the preparation called "essence d'orient," with which glass beads are lined. This art, now brought to great perfection, has considerably reduced the price of real pearls. A French marquis of small means is said to have made an early use of Jaquin's invention, gaining the affections of a lady by presenting her with a necklace, which cost him only three louis, while the lady, in ignorance, thought it worth 20,000 francs.

The shell of the pearl oyster is not the "mother of pearl" of commerce, which is another species of mollusc that comes from the Sulu or Arrow islands, near Singapore. This shell-fish produces few pearls, but gnarled excrescences are occa-

sionally found on the inner surface, which are highly prized by the Chinese. The only use made of pearl oyster shells is to burn them for lime.

Description of the fishery.—The period when the fishery commences each year varies from March, the usual time, to May, but never later, on account of the swell from the south-west monsoon causing too much motion in the boats, and lasts about a month. Aripo and Condatchy, where it usually takes place, are two small fishing villages close to each other on the northern coast, consisting of a few scattered houses and official buildings, the Governor's Doric mansion, as it is called, being the chief feature, rising above the long sandy beach, from time immemorial resorted to by adventurers in the hope of gain.

Few places are more dreary and barren than the country about Aripo, a river flows into the sea near the village, but water is very scarce in the district. A few palms here and there on the coast, and a straggling thorny jungle inland, is the only vegetation to be seen. A hundred thousand people are said to be collected from all parts of Asia during the month the fishery lasts, the vicinity assuming the appearance of a vast fair; an immense impromptu bazaar, composed of huts and sheds made of palm leaves, mats, cotton-cloth, straw, and boards, rises by magic on the barren sands, thronged by a motley crowd, including snake charmers, jugglers, dancing girls, fakers, and vagabonds of every description, the variety of costume and feature affording many subjects for an artist's pencil. The whole fishery presenting a scene of novelty, variety, and disgust not to be matched, the air being poisoned by decaying fish, and many of the fakers you encounter, the most revolting objects that can be imagined. Besides the swarms on shore, the sea is covered with hundreds of canoes and dhoneyes of all sizes, most of them from the opposite coast of India, bringing provisions and other goods to supply the wants of the crowd. Strong detachments of Malay police and military are also sent from Colombó, and a man-of-war stationed in the offing to maintain order.

The banks of rock and coral to which the pearl-fish adhere are situated at different distances from the shore, varying from

six to twelve miles, and the depth of water varies from seven to thirteen fathoms. The principal coral bank at Aripo is ten miles long and two broad. Previous to the fishery they are all examined by the Government boats and divers, and the places where the fish are to be found marked by buoys. The banks six or eight miles from the shore are preferred by the divers, the currents not being so strong as further out to sea. The greatest depth at which the fish can be reached by the divers is thirteen fathoms.

The diving is performed from boats, generally about eight or nine tons burden, without decks, and very rudely put together, having prow and stern alike, one mast, and a lug sail, sewn with coir, and are quite unmanageable in a heavy sea. The crew consists of thirteen men and a captain, with ten divers. The number of boats varies from a hundred and upwards.

The divers are principally Malabars, from Cape Comorin, and a few come from the Persian Gulf. They all wear amulets and charms against sharks, given to them by a professional "shark charmer," called in Tamil Kadal-Katti, and in Hindu Hai-bandha, or shark binders. This important and indispensable functionary—for no diver would dare venture below the surface without a charm—was some years since paid by Government, at the rate of ninepence per diem, and a bonus of ten fish from each boat. He is, in fact, a Government official, the office being hereditary in his family, and, strange to relate, the circumstance that this functionary in 1847 was a Catholic in no way impaired the virtue of his charms in the eyes of the divers.¹ He is assisted in the business by one or two neophytes, members of the family, and usually accompanies the divers' boats. The divers have not much in reality to dread from the sharks, as the noise made by the multitude in the boats frightens them away, sharks being naturally timid and cowardly; besides the dark colour of the divers' skins prevents the fish seeing them far off. This is so well known that the Persian and Arabian divers, whose skins are paler than the Malabars, blacken them on purpose. Accidents from sharks

¹ Tennent.

rarely happen, but occasionally one of the divers has an arm or a leg bitten off, and there have been some instances when those in the Persian Gulf were cut in two by the gigantic saw-fish (*Pristis antiquiorim*). Sharks are said to be much more dangerous at night than during the day; however, such is the dread of these formidable fish among the men that when one is seen the fishing is suspended for the day. Some of the Malabar divers are Christians, and the Portuguese priest of the village gives them rosaries and amulets containing extracts from scripture, written on palm leaves, wrapped up in oil paper. Caesar Frederick says in his time (1563) the divers were all Christians, under the care of the friars of St. Vincent of Paul, and this was generally the case during the Portuguese régime.

Mas'udi mentions that "the divers in the Persian Gulf blackened their legs to frighten away 'sea monsters,'¹ and also filled their ears with cotton steeped in oil, and stopped their nostrils with a piece of tortoise-shell shaped like the iron of a lance, which compelled them to slit the root of the ear in order to breathe." Some of the practices he mentions are alluded to by other travellers, and are still in use among the Bahreen divers. Ibn Batuta says they put a piece of tortoise shell up their nostrils, and also covered their face with a mask of the same material, from which it is to be inferred he was alluding to some kind of diving helmet, also mentioned by Mandelsloot, who says they were made of leather with a long pipe attached to them, but it is probable both these travellers were romancing. Colonel Wilson, in a memoir on the Persian Gulf fishery in the "Journal of the Geographical Society," 1833, says the modern divers use a small piece of horn that compresses the nostrils and keeps the water out, and also stuff their ears with wax for the same purpose. These practices

¹ "Ils s'induisaient les pieds et les jambes d'une substance noirâtre, afin de faire peur aux monstres marins, qui sans cela seraient tentés de les dévorer; ils se fendaient la racine de l'oreille pour respirer; en effet, ils ne peuvent se servir pour cet objet des narines, vu qu'ils les bouchent avec des morceaux d'écaillés de tortue marine . . . ayant la forme d'un fer de lance. En même temps, ils se mettent dans l'oreille du coton trempé dans l'huile."—Reinaud, Mém. sur l'Inde, p. 228.

are however, rejected by the Comorin and Ceylon divers, who only compress their nostrils with the left hand.

Manner of diving.—Every evening towards midnight the boats containing the divers put off from the shore to the beds, where they anchor and wait for the signal gun at sunrise to commence diving, which is superintended by the Government inspector stationed in the boat of the head Adapanner or chief of the divers.

In order to descend to the bottom as rapidly as possible, the divers stand on a stone of a conical shape with the point downwards, weighing from fifteen to twenty-five pounds, suspended from a rope passed over a boom projecting from the side of the boat, and secured with a slip knot. The stone has a hole in the top, through which the rope is passed and formed into a loop like the stirrup of a saddle. They also take with them a bag net made of coir thread stretched on an iron hoop, something like an angler's net without the handle, and to which a running rope is attached.¹ When about to descend, the diver takes hold of the rope from which the stone is suspended, with his right hand and puts his right foot into the loop, placing the net between his legs, with the left foot on the hoop; being thus ready he presses his nostril with his left hand, and giving the rope a sharp pull descends with great rapidity to the bottom, where he abandons the stone, which is pulled up by the men in the boat. The moment the diver reaches the bottom he throws himself on his hand and knees, filling his net as rapidly as possible with all the shells within his reach, sometimes crawling a few yards before he finds them. He then pulls the rope attached to the net, which is hauled up by the men in the boat, coming up part of the way with it, when he lets go, and rises by himself to the surface, where he rests holding on to the boat or paddling in the water while another diver descends with the same stone, two of them being attached to each. This manner of diving is very simple, and cannot be much improved.

¹ Some writers in describing the pearl fishery say erroneously the divers use baskets to put the shells in; a basket would be a very awkward thing for a diver to drag to the bottom. Marco Polo, with his usual accuracy, mentions the net.

A quantity of water and blood frequently issues from the diver's mouth, ears, and nose when they reach the surface, which is thought by them to relieve the head, and the employment, though severe and very exhausting at the time, is generally considered healthy and conducive to bodily vigour. They descend about fifty times in a day, and abstain from food during the occupation. A good diver will bring up from 3,000 to 4,000 shells in a day, but this in a great measure depends on the profusion or otherwise of the fish within their reach at the bottom; sometimes they are able to get 150 fish into the net, at other times only half-a-dozen.

The usual time that a diver remains under water is from fifty to sixty seconds, according as the depth varies from nine to thirteen fathoms, although some divers can stay longer. Captain Percival makes the general time from two to five minutes, which is much too long. Captain Stewart, who was superintendent, says they seldom remain under water more than from fifty-three to fifty-seven seconds; ¹ having requested some to stay below as long as possible, he found they remained eighty-four seconds, being then warned by a singing noise in the ears and a choking sensation to ascend. He also mentions that some French officers who visited the fishery in 1828, offered a reward to the diver who should remain longest under water, when one of them stayed eighty-seven seconds. Ribeyro roughly estimated the period as being that in which a person could repeat two credos—"Se gasto dous credos de tempo." ² Colonel Wilson states two minutes is the average time that the Bahreen divers remain down; and Le Beck says he saw a Kaffir boy from Karical remain under water for seven minutes, which seems incredible. ³

Some years since, the average earnings of a diver during the fishery was from thirty-five to forty rupees, or about 3*l.* 15*s.* 4*d.* for eight days' work, being rarely employed longer.

Soon after noon the diving ceases, and the boats taking advantage of the sea-breeze which usually springs up, then

¹ Mem., p. 58.

² Lib. i., ch. xxii.

³ Asia. Res., v. 402; J. G. S., iii. 284.

return to the shore, where a crowd of men, women, and children, are in waiting to unload them.

The principal speculators in the fishery usually sub-let the right to fish to adventurers, chiefly from India, who fit out boats for the purpose. The shell fish are also sold by the thousand to smaller speculators who either open them themselves, or retail them to all who are inclined to try their luck, a general sale of fish taking place every evening when the boats arrive, as there are few persons at the fishery who do not speculate more or less. The price varies from seven to eighty rupees per thousand, according to the season, and two shell-fish can be had ordinarily for a "fanam" or three-halfpence. A story is told of a poor man who bought three fish for that sum, and found in one of them the largest pearl obtained during the season. The number of fish brought to shore each evening regulates the price, for a fishery may begin very well and end badly, as no very accurate estimate can be formed beforehand of the number of fish the beds will yield. Sometimes a boat will bring 30,000 to shore, and on other days not half that number, and 2,000,000 have been landed in a single day. The fishery of 1814 was calculated to have produced 76,000,000, the largest number ever known.¹ At the re-opening of the fishery in 1857, "an enormous quantity were landed, 1,500,000 being brought to shore daily;"² in 1859 it produced 9,534,951.

The purchasers of a few hundred or less fish usually open them at once, and some bury them in holes in the sand; it is said keeping them until the flesh in the shells decomposes, injures the colour of the pearls, turning them yellow, while opening them by force is apt to damage the pearls, and would not be practicable on a large scale, so that by far the greater number of fish are left in heaps in hollow enclosures called "cottoos" until they are decomposed; the "cottoos" are made of bricks and covered with sheds fenced round and guarded to prevent pilfering.

¹ Cordiner mentions that some merchants brought 20,000 pagodas with them to speculate, and purchased £4000 worth of pearls in a day. In 1798 the chief renter paid the Government £140,000, and realised £192,000 (ii. 73).

² Report of Governor, Blue Books, 1860, xxi. 143.

The putrefaction of such immense numbers of fish engenders vast swarms of flies, who fill the air and infest the habitations, no place being free from them, while the atmosphere is corrupted for miles, and is perfectly horrible, producing at first nausea, but after a time the nose and stomach become accustomed to it, and some persons have even thought it has the effect of sharpening the appetite. The wonder is, it does not create a pestilence, particularly where water is so scarce that every drop of it has to be purchased, but it is said, "the mortality is not greater at Aripo than among the crowded populations of the native towns; vegetable decomposition being considered more fatal in tropical climates than animal."¹

When the fish are sufficiently decomposed, they are thrown into troughs and well washed in sea-water, the odour which arises from this process being fearful; the shells are then removed and examined, as pearls are sometimes found growing to them, which are cut off, search is next made for the larger pearls in the bottom of the troughs. When they are secured, the sand and mud in the troughs is searched for the small and seed pearls, which is performed by women and children, who sit in rows on mats with the sand spread on brass trays in their laps, when it is carefully looked over and the pearls picked out. The next operation is "the sorting," all the pearls being screened through ten brass sieves shaped like saucers fitting into each other, the holes in them decreasing in size from the first to the last, through which only seed pearls pass.

It has been ascertained that the pearls of all sizes found in 17,000 fish amounted to three-quarters of a pound in weight, about sufficient to fill the bottom of a small soup-plate.² Some curious calculations can be deduced from this: taking as an average that 20,000 fish yield one pound weight of pearl, a fishery that produced 10,000,000 of fish would give 500 pounds of pearls, which at £80 per pound would be £40,000, the average value of such a fishery, according to the revenue returns; taking the total sum received since the British occupation at £1,200,000, and dividing it by £80, the average

¹ Dr. Marshall's Ceylon.

² Cordiner, p. 63.

price of sorting pearls,¹ gives 15,000 pounds weight of pearl collected since the year 1795 to the present time, or nearly seven tons! of these precious gems decorating the fair sex in various parts of the world, besides those collected in past ages of which no estimate can be formed.

Drilling and polishing pearls.—These gems undergo various operations before they leave the hands of the dealer; by far the larger proportion as they come from the shells are irregular in shape, and many have little excrescences on them which require to be cut off, while others of a dark colour are improved by having the outer coating of nacre removed, which reveals one underneath clear and brilliant, and they all require more or less polishing with powders made of rice, salt and seed pearls.

Among the multitude who resort to Aripo are numbers of artizans from India, skilled in all these operations; the Indian workmen are more expert at drilling pearls than the European, making a smaller and straighter hole; the machine they use for this purpose is of the most primitive description, being a cone-shaped block of wood with short legs inserted in the base, on the upper flat surface are various holes into which the pearls are placed, being kept in their position by a small wooden wedge. The drill is a reed with a needle at one end, and an iron point at the other working in a hole in a piece of cocoa-nut shell, pressed against the man's forehead, while he sits with his head bent over the block, turning the drill with a bamboo bow, occasionally moistening the pearl with a drop of water applied with the little finger.

The annual spring pilgrimage to the great Hindu Pagoda in the island of Ramiseram is a kind of appendix to the pearl fishery, taking place about the same time. Thousands of fakirs and pilgrims cross over from Southern India, and the fishery is sometimes interrupted by the divers leaving as pilgrims. A person can here get a very good idea of the habits and manners of India, the most painful objects it is possible to conceive, abound among the self-tortured fanatics who crowd the vicinity, mixed with the gaudily painted and gilded vehicles of the

¹ Milburn, "Oriental Commerce."

richer devotees, drawn by cream-coloured oxen with large humps and deep dewlaps; some of these Brahmin cattle as they are called, being splendid animals. When the ceremonies at Ramiseram are ended, numbers of the pilgrims pass on to Dondra Head, and others go to Adam's Peak. These pilgrimages are a public nuisance, and ought to be prohibited in consequence of the total disregard to sanitary precautions generally bringing some epidemic with them.

CHAPTER XXXI.

COFFEE.

THIS plant is not indigenous in Ceylon, having been introduced from some other country, but by whom or when is not known ; some suppose it was either the Arabians or Persians, and it is said to have been growing in the island before the arrival of the Portuguese, in 1505;¹ but there is no proof of this. (*Vide* ch. xxxv.)

The use of coffee as an alimentary infusion seems to have been first practised in Abyssinia, where the tree is indigenous, growing wild on the western mountains. She-ha-beddin-ben, an Arab writer of the fifteenth century, says it has been used by the Abyssinians from time immemorial. In Arabia, where the plant is supposed to have been brought from Abyssinia, its use as a beverage is attributed to Gem-all-eddin, mufti of Aden in Arabia Felix, who became acquainted with it in Persia about the middle of the fifteenth century. According to an "MS." in the Paris Library, coffee was first used there in A.D. 875.² The period of the introduction of the coffee plant into India is also unknown, the first who mentions it as a product of the peninsula is an Arab writer in Quatremère's "Mémoire sur l'Egypte," who says it was brought from India along with other merchandize to Jedda, in the year of the Hejira 831 (A.D. 1453).³

¹ Tennent, Ceylon, ii. 226.

² M. Merat, quoted by Dr. Pereira, ii. 67 ; Ellis, "History of Coffee," ed. 1774.

³ "L'an 831 on apporta au Caire la dime que l'on avoit levée sur les marchands de l'Inde qui abordoient à Djiddah (Jedda) ; elle consistoit en café, en schals et autres objets de commerce, valant cinquante mille dinars."—*Mém. sur l'Egypte*, p. 299.

Coffee was first publicly sold at Constantinople in the year 1554; its introduction into that city, as well as at Cairo and other places, led to several riots, the Turkish mufti complained that the mosques were deserted for the coffee-shops, and they were at one time closed by the authorities; it is a curious coincidence that the drinking of coffee in England was also forbidden by a proclamation of Charles II., in the year 1675, as leading to seditious assemblies.

The first European who mentions coffee was Leonhart Rauwolff, a German physician, who travelled in the East in 1573, but his account is not very accurate; according to him it was called "chaube" in Aleppo, and brought there from India. The plant was next accurately described by Prosper Alpinus, a traveller in Egypt in 1580, in his "*Plantæ Aegyptæ*;"¹ he says it was called Ban or Bun by the Arabians, one of their names for the plant at the present time. The term is also used in Hindustan. The other Arabian name, "kâwâh," is similar to the Persian. William Finch, a merchant in India, appears to be the first Englishman who speaks of the beverage, saying "there is in Socotra a black bitter drink which the inhabitants sip hot."²

Its introduction into Western Europe is attributed to the Venetians; there is a letter written by Pedro De-la-Valle, the well-known traveller, in 1615, from Constantinople, in which he states his intention of bringing some home with him. About twenty-five years later some gentlemen brought the berry to Marseilles,³ but it was not until many years after that the first coffee-house was opened there. In 1671 an Armenian, named Pascal, opened a "café" in Paris, nineteen years after its introduction into London, where the first coffee-shop was opened by a Greek named Pasqua, in George-yard, Lombard-street, in the year 1652.

"It was introduced into the Archipelago by the Dutch in 1690, when some seeds obtained from Arabia were sown in the garden of the Dutch governor, Van Horne, at Batavia; they

¹ Quoted by Dr. Moseley in his "*Treatise on Coffee*," London, 1792.

² Purchas, *Coll. Voy.*, p. 419.

³ De la Roque, *Voy.*, ii. 310.

grew and produced fruit, one of the plants was sent to Holland as a present, and surviving the voyage round the Cape, was planted in a botanical garden at Amsterdam, where it flourished; some plants from it were subsequently sent to Surinam in 1718, and from thence taken to the West Indian islands in 1728."¹

It is not known when the Dutch first tried to cultivate coffee in Ceylon; they do not appear to have been successful in their endeavours, as after a time they abandoned the project. The natives, however, who had become aware of its value, cultivated it in small quantities round their hamlets, which supplied the bazaars of Colombo with the berry, and previous to 1840 the principal part of that exported was of native growth. When the English captured Kandy they found numbers of coffee plants growing in places under the trees in the jungle, which were stated to have been planted in order that their flowers might be used in the temples.

The Dutch are said to have discouraged coffee growing in Ceylon, which was reserved for Java, but it is more probable that they found the parts of the island in their possession unsuited for the profitable growth of the plant; a fact which many English planters afterwards discovered to their cost. Governor Schreuder in his report, 1762, says, "only 200,000 lbs. of coffee have been grown, as the competition from Java and the West Indies is so great we cannot keep up the price, so the culture fell off."² According to M. Burnard, Ceylon coffee is superior to Java, resembling the Arabian, where the first plants came from.

With regard to the statement that the coffee plant was growing in the island when the Portuguese arrived, it is strange if such were the case that the Dutch should have sent to Arabia for seeds to plant in Batavia, when they might have obtained them in Ceylon. In all probability the introduction of the berry is due to them. Simmonds says it was introduced in 1780 from Java, and Governor Van Imof in his report, 1740, mentions they had begun to plant it.

¹ Crawford, Dict. of Arch.

² Reports of Dutch Governors in Lee's Ribeyro, p. 193.

After the occupation of the island by the English some attempts at coffee planting were made at Gindura,¹ about sixteen miles from Galle, which were unsuccessful. Sir Edward Barnes was the first to point out the hill district as a more

¹ Lewis, Hist. Coffee Plan., 1855 ; Burnard, Asia. Jour., xi. 444.

The following are some of the exports of Coffee from Ceylon since 1806 :—

1806	94,500 lbs.	
1810	217,000 ,,	
1813	216,000 ,,	Bertolacci.
1827	1,792,000 ,,	
1837	6,756,000 ,,	
1847	19,475,000 ,,	
1857	67,450,000 ,,	Tennent.
1866	897,624 cwt.	Blue Books.
1868	1,607,338 ,,	
1869	919,065 ,,	

Reports in Blue Books : 1867–8, vol. xlviii ; 1870, vol. xlix.

Export of Coffee from the West Indies since 1827, in round numbers :—

1828	30,000,000 lbs.
1831	20,000,000 ,,
1841	9,900,000 ,,
1850	4,260,000 ,,

From whole of English Colonies except Ceylon for half year 1871,
13,011,478 lbs.—Blue Books.

Number of acres of land sold for Coffee Plantations from 1837 to 1845.

1837	3,681
1838	10,401
1839	9,570
1840	42,841
1841	78,841
1842	48,533
1843	58,336
1844	20,415
1845	19,062

From Calcutta Rev., 1857.

In 1660 a tax of 4*d.* per gallon was imposed on coffee in England, being at that time only sold in a liquid state. In 1732 a tax of 2*s.* per lb. was substituted for it ; and in 1824 the duties were 1*s.* on West Indian, 1*s.* 6*d.* on East Indian, and 2*s.* 6*d.* on foreign, but reduced the following year to one half. In 1835 the duties on East and West India were equalised. A further reduction was made in 1842 to 4*d.* on British and 8*d.* on foreign, the latter being reduced in the following year to 6*d.* In 1851 protection to Colonial produce was withdrawn, the duties being equalised to 3*d.* per lb.

suitable locality, and taking advantage of the reduction of duty to one-half in England in 1825, which led to an increased consumption, several plantations were formed about Gampola and Peradenia; one at Gangarowa belonged to himself; but little progress was made until after 1837, when nearly 4000 acres were planted. At this time the great falling off in the supply of coffee from the West Indies in consequence of the abolition of slavery in 1830, gave an impetus to the Ceylon and Indian trade, and the profits accruing from the estates then coming into bearing through this unlooked for event, gave rise to the coffee mania of Ceylon, which commenced about 1840, and ended in the collapse of 1845, mainly caused by the sudden lowering of the differential duties on foreign coffee, 50 per cent. in 1843, with the prospect of the withdrawal of all protection from the competition of foreign countries soon after.

The rush which took place in those five years to the jungles of Ceylon resembled that to the Australian gold diggings; besides the number of civil servants and military in the island who embarked in the affair, many speculators came from India, Europe, and elsewhere; and in the single year of 1841, 78,841 acres of jungle were sold, the hills and valleys round Kandy, Dombëra, Ambagammaoa, Pusilawa, Kotmalee, and the sides of Adam's Peak resounded with the blows of the planter's axe and the crash of falling timber. The haunt of the elephant was invaded by the white man from the West, and it seemed as if in a few years there would not be a tree left to shelter them. At the mess-table, in the private circle, in the ball-room, nothing was talked off but coffee. Thousands of Malabar coolies, attracted by the golden harvest for their labour, swarming across the straits at Ramiseram, invaded the island and marched to the scene of operations.

It has been estimated that £5,000,000 were invested in a few years in the speculation which ended so disastrously to the majority of those who engaged in it. Two valuable estates at Badulla, worth £10,000, were sold for £350, and one at Hindugalla, worth £10,000, brought £500.¹ Mr. Austin, in a

¹ "Calcutta Review," March, 1851-57.

memoir attached to Lee's Ribeyro, mentions that an estate which was sold in 1843 for £15,000, was knocked down at an auction in 1847 for £40?¹ Mr. Rigg, in the "Journal of the Archipelago" for 1852, calculates that ninety per cent. of the speculators lost everything, seven per cent. picked up only the fragments of their property, two per cent., who took the hint in time of what was coming, got off clear, and one per cent. made a fortune. Mr. Fergusson makes the number of abandoned estates much less, being only one-tenth of the whole.²

Although there is no doubt the Government of the day were highly to blame for neglecting the interest of the colony in favour of the foreigner, by making a sudden reduction in the differential duties which protected the colonists, and on the faith of which the speculators had embarked—still, some of the disaster which befell them was owing to themselves and ignorance of the nature of the soil; one Scotchman is related to have actually planted an estate in the height of the dry season, plantations were formed on villainous quartz rock, where there was very little mould, and this was washed away by thunderstorms, when the brushwood, which kept it in its place, was removed. In other cases the phosphates in the soil were exhausted in a few years, and the plants withered; districts which seemed all that was desirable at first, proved to be unsuited for the continued profitable cultivation of the plant without an amount of manuring and care which never entered the imagination of the speculators, who concluded that the soil of a virgin forest would have borne crops for an indefinite period, but the soil of Ceylon is peculiar.

Liebig has estimated that there is a preponderance of lime in the coffee plant, containing seventy-seven per cent., potash twenty, and silex three. Dr. Gygax, in the Jour. Ceylon A. Soc., makes it sixty per cent. of lime; he says, "If this substance is not in the soil it must be supplied by artificial means. It is a singular fact, that the rocks of Ceylon are deficient in alkaline matter, and taking this view one can no longer wonder why so many plantations failed—the burning of the trees which

¹ Lee's Ribeyro, p. 229.

² "Colombo Observer," 1857, quoted by Sir E. Tennent.

covered the land contributed a great portion, but this was soon dissipated by heavy rains and other causes. "Nature, however, supplies the deficiency in another way, through the dolomite, which in some places is not pure, being mixed with apatite and phosphate of lime; estates situated where this is found answer well, while those on the pure magnesian lime-stone are bad." Burnt dolomite makes a good manure, but the best is said to be the leaves of the trees themselves, or bone dust, but this is expensive; guano has been tried and does not answer; the Singhalese have been long aware of the value of bone manure, and use it in their paddy fields.

The Rambodde district has been found to produce the best coffee, and Dombera the worst; the Ambagamma district is also not good. The best situations are hill sides, at an elevation of between 3,000 to 5,000 feet, refreshed by frequent showers, and where the temperature ranges from about 60° in the morning to 75° at noon. The higher it is cultivated below frost at night the better, the quality being superior to that grown lower down, but the produce is less, averaging about seven cwt. per acre. The yield is said to vary in different parts of the island from four to fifteen cwt. per acre. Estates situated on dry land in the vale of Dombera have been improved by irrigation. The requirements of the coffee plant in Ceylon with regard to moisture do not harmonise with its growing in Arabia Felix, where there is so little rain, but it is said to be often a failure there from dry weather; the principal crop is grown on the sides of hills in the neighbourhood of Aden; when grown on lower ground it is planted among larger trees to shade it.

The capacity of some parts of Ceylon to produce coffee at a fair profit¹ on the capital laid out seems to be proved from the way the trade in the berry has survived the collapse of 1845, and the competition of other countries; the export in 1868 being 1,007,338 cwt., valued at £2,563,999, and paying the Government of the colony an export duty of £50,367.

¹ Sir H. Robinson, the late Governor, in his Report on the Colony for 1867-8 says, "I believe there never was a time when coffee was more remunerative than at present if only judiciously conducted."—xlviii., 1871.

The first speculators, who expected to realise an immense fortune in a few years, have been succeeded by others, whose expectations are more moderate, and, profiting by the mistakes of others, have placed coffee planting in the island on a satisfactory footing. The average quantity annually exported since 1865 has been 950,000 cwt., valued at £2,350,000; and in 1871 the import of Ceylon coffee into England exceeded by 7,000,000 or 8,000,000 lbs. that from all other parts of the world put together.¹ There has been a great decrease in the export of native coffee since 1872, and a direct trade to Mediterranean ports has sprung up since the opening of the Suez Canal, annually increasing. Still, according to most accounts, it is not a very profitable business, and one subject to many risks; the wages of the Malabar coolies are high, rice must be imported for them from India, and the carriage of the produce to the coast is expensive.² Then the coffee tree has numerous enemies, being much ravaged by squirrels, monkeys, wild cats, and rats, who eat the ripe berries and young shoots. A fly called the coffee bug at one time threatened to destroy whole plantations, and new pests in the shape of insects are constantly showing themselves.

The labour of clearing the jungle and cutting down the trees is immense; when the site is a side of a hill advantage is taken of the slope of the ground to clear it in a very expeditious manner. All the trees are cut half through first, this

¹ The total imports of coffee into the United Kingdom for the first half of 1871 were as follows:—

Ceylon	47,339,226 lbs.
Other Colonies	13,011,478 „
Brazil	16,946,114 „
Central America	3,962,384 „
Other countries	9,221,092 „

Reports in Blue Books, 1871, vol. lxiii.

The most absurd statements were made of the fortunes to be realised by coffee planting, for instance, “300 acres might be planted and kept up for several years, yielding a net profit of £11,900, for an expenditure of £3040, and forming a property worth £15,000.”—*Calcutta Review*, 1857.

² One enterprising planter employs a traction engine brought from England. From 1841 to 1848 £2,000,000 worth of rice was imported.

being accomplished, a number of them at the top of the hill are cut down at the same time, and, falling on those below, their weight brings the remainder down with a succession of tremendous crashes that can be heard a great distance. The trees are often so entangled and tied together by gigantic climbing plants, *Bauhinias* and *Mimosæ*, called jungle rope by the planters, passing from tree to tree like the rigging of a ship, that this is the only plan of clearing the forest without an expenditure of labour that would be ruinous. Sometimes the jungle rope is made to help the process of clearing by cutting the trees quite through at the bottom first, their weight pulling those at the top down. The fallen trees are subsequently burnt. The cost of clearing an acre of land has been estimated at from £8 to £10, the price of the land being £1.

Although at the commencement of the clearing of the forests many Kandians and Sinhalese from the low country flocked to the scene of labour, tempted by the high wages offered by the planters, they soon found out that the work was too hard for them, and could not be induced to continue at it for any length of time. The Kandian returned to cultivate his rice field, and the Sinhalese sought the low country to spend his hardly earned money in gambling. In this dilemma the planters turned their attention to India to furnish the labour required, and Malabar coolies, naturally an industrious race, were induced to emigrate to Ceylon.¹

The herding together of thousands of these wretched coolies—badly fed, clothed, and housed, there being no accommodation for them in those wild and uninhabited places, but such

¹ Number of Malabar Coolies who emigrated to Ceylon from 1841 to 1848.

1841	4,000
1842	9,000
1843	6,000
1844	74,000
1845	72,000
1846	41,000
1847	44,000
1848	12,000

From Mr. Rigg's J. of the Arch., 1857.

as the planters could hastily put together, 'exposed to the chill night dew, over-worked, and fatigued by a long journey through the northern provinces, the route by which the majority of them travelled—caused a great deal of disease and mortality. It has been estimated that in eight years 70,000 Malabar emigrants died on the coffee plantations of Ceylon.¹ Many, however, saved money and returned to India after a few years, carrying with them, it is said, £400,000, ninepence per diem, the wages paid, not being bad with their frugal habits.

Coffee belongs to the order *Cinchonaceæ*.² There are several plants in different countries resembling the Arabian (*C. arabica*), but it is the only one which contains the principle called caffeine that renders it so valuable. Two or three allied plants are found in Ceylon and India, and stray plants of the true coffee tree spring up in the jungles from seeds carried by birds.

The coffee tree grows naturally to a height of fifteen feet, throwing out lateral branches all round the stem, but when cultivated is pruned into a pyramidal form, four or five feet high, and usually produces fruit in four years, ceasing to bear at twenty-five years. Young plants are sown in a seed bed, being transplanted in rows about eight feet apart. The leaves are oval and sharp pointed, and the flowers white, with a five-cleft corolla, growing in clusters round the branches, producing an oval berry resembling an olive when young, but when quite ripe, of a deep crimson, and like a cherry, with a sweetish-tasting pulp surrounding the seeds, which are enclosed in a kind of parchment sack with a very thin silvery inner skin; generally there are two seeds with the flat sides lying together, when there is only one seed it is small and round, and reputed to make the best coffee.

The period when the crop ripens varies in different districts, but the main part comes to maturity in October and November,

¹ A law was passed in 1867 imposing restrictions on the superintendents of coffee estates and regulating labour. In 1872 it was proposed to compel proprietors of estates to provide medical aid and accommodation for sick Coolies employed by them, and to report within twenty-four hours every death that occurred, &c.—Ceylon Gov. Gazette, 1872.

² The true coffee tree is said to have been found growing wild near Rio de Janeiro by Meyen.—Geog. Bot., English trans., p. 384.

flowering in March, when the small pure white flowers bloom in the most sudden manner, all opening in a single night, and filling the air with a perfume like jessamine. When the ripe berries are gathered they are passed through a mill to separate the pulp from the parchment covering the seeds. Several machines have been invented for this purpose. That in general use some years since was a wooden cylinder covered with a sheet of brass punctured with holes like a nutmeg grater. After the berries have been pulped they are thrown into heaps until they ferment a little, when they are well washed and then dried in the sun. The frequent showers and dampness of the hill climate often prevents the perfect drying of the berries, and machines have been invented for forcing a current of air through them.

When the parchment covering is quite hard and dry it is crushed under a wooden wheel to separate it from the berries inside. They are then forwarded to Colombo, where they are again dried and picked in the sun by women. Some proprietors prefer sending the berries in the parchment to Colombo, where they are crushed.

Dr. Gardner, of the Peradenia Gardens, took out a patent for drying coffee leaves, to be used as an infusion like tea, but although the infusion is quite as good as that from the berry, the plan has not answered in a commercial point of view, as removing the leaves is said to injure the plants. Coffee leaves have long been used in this way in Sumatra.¹

Mr. Fergusson, who has written one of the best accounts of coffee planting, estimated the number of estates in 1857 at 403, containing 80,950 acres in full bearing, giving employment to 129,200 coolies, and producing 847,100 cwt. of coffee; at the same time there were 50,000 acres belonging to natives, producing 160,000 cwt.; the total acreage being 130,000. In the reports on the agriculture of the island for 1864,² the number of acres in coffee is set down at 162,700, which, at an average of five cwt. per acre, would give 813,500 cwt., about the quantity of coffee exported at that time, and employed 146,000 coolies.

¹ Dr. Hooker, Report Exh., 1851.

² Vol. lxxii. Rep., 1866.

CHAPTER XXXII.

THE PALMS.

THE varieties of the palm family are not so numerous in Ceylon as India, but some of the most useful attain a higher degree of perfection than in any part of the world ; altogether, there are fifteen species.¹

*Areca*s.—The most important of these is the *A. catechu*, “poo-wak” of the Singhalese, a very graceful tree from forty to seventy-five feet high, with a remarkably slender trunk surmounted by a tuft of dark green feathery leaves. When five years old it begins to flower, producing the well-known areca-nut, which hangs in clusters from a bunch of very fine stalks, looking like diminutive cocoa-nuts, being covered with a similar fibrous husk. The nut is brown veined internally with white, and when fresh cuts easily with a knife, becoming hard and dry with age. They have been analysed by Morin, and contain a large proportion of tannin.²

Unlike the cocoa-nut, which only flourishes on the coast and loves the saline breeze, the areca grows well in the interior, being largely cultivated in the native gardens of the southern and central provinces chiefly for the sake of the nuts, each tree producing about 200 annually, the flowers diffusing a delightful fragrance in their vicinity. Great quantities are brought down the Kaluganga from the neighbourhood of Ratnapoora, forming a valuable and extensive article of export, amounting in 1867 to 97,159 cwt., valued at £74,369, chiefly to Mauritius, the Maldives, and India, where they are highly esteemed and used as a masticatory along with betel.

A species of catechu, or terra Japonica, a clayey-looking sub-

¹ Thwaites' Plan. Zey.

² Pereira, i. 153.

stance, used for dyeing calico a golden brown, is made by boiling areca-nuts in an iron pot with water until the liquid becomes solid when cold. There are many varieties of catechu in commerce, some being used in medicine, as the *Acacia catechu*, and that made at Singapore by boiling the young leaves and shoots of the *Uncaria gambier*, one of the Rubiaceæ, a very astringent substance containing a large quantity of tannic acid. Areca wood is very strong and elastic, and much used for making "pingos." This tree was unknown to either the Greeks or Romans, but is apparently alluded to in Palladius.

Among the other species found in Ceylon is the *Caryota horrida* of Moon,¹ called "kattoo kittoo" (thorny palm) by the natives, a remarkable variety, found in the forests of the central province, which grows to a great height, having the stem for six or eight feet from the ground covered with strong spines so close to each other as almost to hide the bark. *Phoenix sylvestris*, a variety of the date-palm (*P. dactylifera*), is very common in the warmer parts of the island; the natives eat the sweet pulp of the ripe seeds, and make mats and betel boxes of the leaves. This is the only variety of *Phoenix* in Ceylon, but they are very numerous in India.

Calamus — the ratans of commerce, waiwel of the Sinhalese, a very singular genus of plants, often exceeding a hundred yards in length, some species climbing trees, while others run along the ground. They are covered with scaly thorns when young, which fall off as the plant arrives at maturity, and have no leaves except a bunch at the end; the fruit, with a husk like a gooseberry, grows in clusters. Some varieties are found in the central province up to 3000 feet. Rumphius says *C. longisetus* in the Archipelago attains a length of 1200 feet. In Ceylon this variety is very much shorter. *Calamus rudentum*, growing chiefly in the hottest parts of the island, is a stout description, the Palma juncus of Rump., and yields a reddish gum to which the formidable name of "dragon's blood" has been given. Ratans abound in the Archipelago, being turned to innumerable uses by the Malays and Chinese, who make rigging for canoes and cables for

¹ *Oncosperma fasciculata*, Thw.

ships with them; in Ceylon they are universally used for bottoms of beds and chairs, and were formerly employed by the natives for making suspension bridges.

Corypha, the talipat or talla-gass of the Singhalese (*Corypha umbraculifera*) is one of the most graceful and majestic of trees, shooting up from the earth nearly as straight as an arrow to a height often of 90 and 100 feet, with a cluster at the top of large leaves exactly like a circular fan opened out hanging from a long stalk, the whole surmounted when in blossom by a cone of golden-coloured flowers about fifteen feet high. This tree only flowers once and then decays, its strength seemingly exhausted in the effort. The bud bursts with a report like that of a gun. Some of the leaves when spread out are thirty feet in circumference, and would cover eight men, standing together, from the rain. Mats are made from them for constructing temporary dwellings or other purposes, and when cut into several pieces are in general use among the Kandyans as a protection from rain and sun, closing up into a small compass when put by or carried under the arm. The Kandyans attribute some of their victories over the Portuguese to them, as they kept their flint muskets dry during heavy rains, when those of the enemy were so damp they could not fire. In the maritime provinces Chinese parasols made of varnished paper stretched on bamboo frames are more in use.

The leaves of the talipat when full-grown are of a deep green colour, but when young of a pale straw tint, and are then used for writing on and making books; the young leaves of the palmyra are also used for this purpose. (*Vide* ch. xxii.) The talipat grows chiefly in warm moist parts of the central and southern province. Palm leaves have been always considered as an emblem of victory, and were carried by pilgrims in ancient times, hence called "palmers." It is curious that Columbus found them in use as a sign of rejoicing among the Aborigines of South America.¹

The Palmyra.—The trees of the palm family, in consequence of their great usefulness to mankind, have been so often described it is difficult to write anything about them that has

¹ Prescott; Levit., xxiii. 40; Matt., xxi. 8.

not been many times repeated. One of the best descriptions of the palmyra is Mr. W. Ferguson's, of the Surveyor General's Department, Ceylon, published at Colombo in 1850. Rumphius has also given an account of them, both in the Archipelago and Ceylon.

The *Borassus flabelliformis*, "tal-gass" of the Sinhalese, is the chief feature in the landscape about Jaffna and the extreme north, upwards of 6,000,000 of them growing there; they are the main stay of the population, furnishing a fourth part of their food, being almost equal in value to the cocoa-nut, every part of the plant serving some useful purpose. The groves of tall unbending palmyras which cover the flat peninsula of Jaffna give the scenery a singular aspect of tameness and monotony, very inferior in beauty to the cocoa-nut of the south, whose irregular growth—some bending one way, some another—produces such picturesque effect. "During the fruit season, when the fires of the watches at night reveal by fitful gleams the thousands of stems, these palmyra groves resemble the columns of a temple."¹

Generally before the fruit ripens periodical showers are expected at Jaffna, called palmyra rains. Elephants cross over at this season from the main land at "elephant pass," and spread over the peninsula to eat the ripe fruit when it falls, and also pull down the young trees for the sake of their tender leaves. Palmyras can grow much closer to each other than the cocoa-nut without great injury to their produce. In some of the groves about Jaffna, where they are in a half-wild state, they stand so close together the sky can barely be seen through their leaves, but such crowding is injurious; about 200 trees per acre, or more than double the allowance for cocoa-nuts, is the utmost an acre can bear and yield a good crop. It is said the Dutch, by clearing away the jungle from the stems, brought the trees into bearing much earlier than when the underwood had been permitted to exclude light and air.

The curious union which takes place between the palmyra and the banyan is the most singular development of tropical vegetation. The banyan in its infancy is a parasitical plant

¹ Ferguson.

living on another, the seeds carried and dropped by birds, taking root in the moist receptacles at the base of the palmyra leaves, speedily throw down long shoots until they reach the ground, ultimately developing into a new tree round the palm which nourished it. One of the curiosities of Jaffna some years since was a banyan which had thus enclosed three palmyras in its coils, affording an extensive shade under their united foliage.

Occasionally the palmyra forms a branching head, the stem near the top dividing into several portions, each like a diminutive tree. Similar instances occur among palms in India, where the variety called by the Arabs the doom, bifurcates in this way. The doom-palm of Egypt (*Hyphæne thebaica*) has always a dichotomous stem. The same thing occurs, though rarely, among cocoa-nuts and areca.

The palmyra in Ceylon attains a height averaging seventy or eighty feet, always growing perfectly upright, unless some accident causes a deviation; the stem is rather thick, ending in a heavy head of fan-like leaves, smaller than the talipat, and large clusters of rich yellow-brown fruit, each the size of a cocoa-nut, but rounder. Six or seven of these clusters, with from ten to twenty fruit on each, and weighing between thirty and forty pounds, are found on a tree. The fruit is covered with an exceedingly hard and tough skin that requires to be torn off in pieces. The Tamils say an elephant could not break one, and contains three seeds or kernels surrounded by fibres resembling coir, mixed with a yellow farinaceous pulp, sweet and oily, made into cakes called poonattoo by soaking it in fresh water, after which the jelly-like portion is squeezed out and spread on mats in the sun to dry, then put into baskets made of palm leaves and smoked. The natives make curries and various dishes of it, but it is unpalatable to Europeans. The kernels are eaten raw and also roasted. Numbers of the fruit are pulled by the natives before they are ripe, when they cut the top off and eat the pulp inside, which in this state is delicious, but considered dangerous, as it causes dysentery.

A kind of vegetable called kalingo is obtained from the kernels when planted for the purpose, and left in the earth

until they have sprouted and grown the size and shape of a parsnip, but nearly white, with three or four rootlets at the larger end. Kalingos are eaten fresh, and also dried in the sun after the parchment-like skin has been removed, when they are called odials. Various dishes and a farina superior to arrow-root are made from them, much used by the natives in Ceylon and Southern India.

Rumphius remarks that the "male tree is like the female in every respect and always grows close to it, differing only in not producing fruit." The nature of the trees cannot be distinguished until they bear, and the young plants are allowed to grow together till then, when most of the male trees are removed, leaving one here and there. When young, the trunks are covered with leaves growing round them in a spiral manner, and festooned with climbing plants and young banyans; as the trees attain age the lower leaves gradually fall off, leaving a portion attached to the stem, giving it a rugged appearance, and at maturity none remain but those that form the head. They begin to yield fruit at from fifteen to thirty years, according to situation, and last for 200 years. The palmyra at all ages is a favourite resort of insects, birds, squirrels, and monkeys, who eat holes in the fruit and throw down numbers when leaping from tree to tree.

The timber is very valuable and extensively used for rafters and laths of houses, being the only kind that resists the attacks of white ants, besides from the structure of its fibres it splits easily in the direction of its length, just suiting the purposes for which it is used, and supports a greater cross strain than any other wood, but nails rust rapidly in it. The Tamils say "it lasts for a lac of years," and it has a density of sixty-five pounds to a cubic foot. The external part of the old trees alone yields firm black timber, the interior like the coconut being pale, soft and spongy, and young trees are nearly white, the wood is not considered of the best quality until the tree is 100 years old, the older the tree the harder and blacker the timber; that from the female tree is the best, being three times the price of the male, which is often steeped in salt water to increase its weight and deepen the colour. A single

tree will only make from three to five rafters, valued at from 3s. to 6s.; the wood is also used for making ornamental articles, as small boxes, rulers, and paper knives. Jaffna timber is very superior to that of the Indian palmyra, and is exported in large quantities to the Coromandel coast, 70,000 or 80,000 trees being annually used for home consumption and export. The timber and jagery exported has been valued at £10,000 per annum.

The internal part of the trunk is turned into a coarse kind of farina with a sweetish taste, and used to attract game when strewn in the jungles, the shells of the nuts and fruit are used by blacksmiths for charcoal, said to give a greater amount of heat than any other, and the leaves make thatching for houses, fences, mats, baskets for holding water, hats and parasols.

The chief produce of the palmyra is the coarse sugar called jagery, made from the toddy, and numbers of coolies emigrate from India at the season of drawing what may be called the toddy harvest. The liquid is extracted from the flower bud in the same manner as from the cocoa-nut palm, described hereafter, and boiled when fresh with lime until sufficiently thick, when the liquid is poured into saucers, or moulds made of palmyra leaves, and left to cool, when it becomes hard and looks like a cake of chocolate; two cakes thus formed are placed with their flat sides together, and wrapped up in palm or cocoa-nut leaves. About three quarts of toddy are required to make a pound of sugar. The flower buds begin to show in November and December, as the palmyra, unlike the cocoa-nut, blossoms only once in a year, about a week after the bud is cut the juice begins to flow, some trees giving six pints and upwards in twenty-four hours, and continues running for four or five months, gradually getting less until it ceases. Once in three years the flower bud is not tapped, but allowed to form fruit which ripen in July or August, as it is found drawing the liquid from the trees every year in succession injures them. Palmyra toddy is excessively sweet and luscious, much more so than that from the cocoa-nut, and is only drunk when the other cannot be obtained. The half-boiled juice, which resembles molasses, is sold at a very cheap rate in the bazaars, and a large

quantity of jagery was exported to India, said to be refined at Madras and sent to Europe,¹ but it cannot compete with cane sugar, being very little, if anything, cheaper in the island than brown sugar in Europe.

Flying foxes frequent palm trees during toddy drawing to drink the liquid, some say the palm cat (*P. typhus*), and one of the shrikes, (*A. fuscus*) called the toddy bird also, but it is doubtful if the two latter do so; the palm cat more probably is in quest of the birds who prey on the swarms of insects attracted by the sweet liquid.

Rumphius says "it is truly remarkable that the two principal palms of India, the cocoa and the palmyra, will not grow in the same neighbourhood, nor even in the same region, which must be attributed to the great wisdom of the Creator, who is unwilling that these trees so productive and beneficial to mankind should grow in the same locality. We see that in all the western parts of Hindustan and Ceylon the cocoa-nut grows vigorously and abundantly, but there we never or rarely see a palmyra; on the other hand, in the east of Ceylon and the Coromandel coast, the palmyra predominates, and the cocoa-nut is rare."

There is some truth in this quaint theory, although it does not prevail to the extent indicated. Cocoa-nuts do grow about Jaffna, but their yield is very inferior to that on the southern coast, and to the produce of the palmyra side by side. Some years since, when there was a rage for cocoa-nut planting in Ceylon, many palmyras were cut down to make way for their rivals, and several other plantations were formed, but it was found in the majority of cases that the cocoa-nut trees failed to come to maturity at the expected time. The venture only returning in some cases from £2 to £2 10s. per acre. The palmyra flourishes over a wide geographical area in the east, extending from Arabia to Amboyna, and along the eastern coast of Africa.

The *Caryota Urens*, "kittool" of the Sinhalese, is a variety which flourishes in woody mountains, found in the southern and central parts up to an elevation of 2,000 feet, generally

¹ Tennent.

in native gardens. The flower buds yield^e toddy in abundance, from which coarse sugar is made, the wood forms rafters similar to those of Jaffna, and the pith a coarse kind of sago; the black fibres of the leaf stalks are made by the Rodillas into ropes of great strength resembling horse-hair, also fish-lines impervious to water, but liable to break if suddenly bent or knotted.¹

² *The cocoa-nut palm*³ is one of the most beautiful, and also the most useful object in nature, its tall and slender stem, from seventy to eighty feet high, surmounted by graceful plume-like leaves, presenting a very striking appearance; it is a common saying among the natives that it can be turned into a hundred different uses; this tree is alone sufficient to build, rig and freight the small Maldivé vessels which visit the island. It produces wine, water, oil, sugar, spirits, vinegar and milk, a species of sago analogous to that obtained from the sago palm (*Sagus lævis*) of the Archipelago is obtained from the pith of the trunk near the head, and a vegetable like cabbage from the young buds, when boiled; the old leaves make huts to live in, fences, and baskets, while the young leaves, being yellow and transparent, make pretty lanterns and decorations, the nut-shells make drinking-cups, spoons, ladles, and charcoal to cook food. Capital brooms are made from the fibres of the leaves, the butt ends of the stalks make paddles for rowing canoes, and the fibres of the husks make ropes, twine, mats, carpets and mattresses.

Various medicinal properties are attributed by the Sinhalese to the cocoa-nut tree; they extract a powerful oil from the bark, used in cutaneous diseases, the juice of the flower makes a very astringent lotion similar to alum, a decoction of the root is given in fevers, and the juice of the leaves mixed with some of the oil is used for ophthalmia; cocoa-nut oil is the best remedy for the stings of insects, and said to be used by chemists in Europe for making unguents. .

¹ Ondatje, "Vegetable Products of Ceylon;" Royle, Madras Exhib., 1855.²

² Rumphius, who gives an elaborate description of the cocoa-nut under the name of "*Palma Indica major*," has enumerated a great many species, which modern botanists have reduced to three—*C. nucifera*, the most widely diffused; *C. fleuvosa*, and *C. plumosa* of Brazil.

The fruitfulness of the cocoa-nut palm is extraordinary, as long as the tree lives it bears without intermission, the blossom and full-grown nut being seen on it all the year round, presenting to view from forty to fifty nuts on an average, in different stages of growth, hanging in separate clusters, of which there are from seven to ten, each tree producing annually on an average forty nuts, nearly a year being required to bring them to the germinating state. They begin to bear about their seventh year, are in full bearing at twelve, in their prime at thirty, and last for seventy or eighty years.

The trunk is composed of hard and flexible longitudinal dark fibres, united by a brown cellular substance, capable of being made into a powder. The outer part of old trees is used for rafters, spear handles, rulers, and other fancy articles. It is known in commerce as porcupine wood. Cocoa-nut stems are so seldom straight, a Tamil proverb says, "that a person who has seen a straight cocoa-nut tree, a paddy bird's nest, a dead monkey, or a white crow, will never die."

The plaited leaves are called cajans, a Malay term. About six feet of the middle of the leaf is cut off when green, and the feathery part torn from the stalk; they are then soaked in water for a few weeks, when they become a deep brown colour, and plaited into a kind of mat about two feet wide, the ends of the leaves forming a fringe on one side, and the stalk a thin lath on the other, making a very light and durable thatch, and entire huts when tied to a wooden frame, also garden fences; they are exported to Northern India.

The following curious calculation regarding the cocoa-nut was made in the "Colombo Observer," December, 1858. "In 1840, 400,000 gallons of oil were exported, worth £26,000, increased in 1857 to 1,767,413 gallons, worth £212,184; forty nuts being required to make a gallon of oil, 70,696,520 would be necessary for the oil exported, as much more being probably consumed in the island, this would make 141,393,040 nuts for oil alone, the produce of 3,534,826 trees at an average annual yield of forty nuts per tree. 5,000,000 of trees are required for toddy drawing, making 8,534,826 for oil and toddy, but as it is supposed there are 20,000,000 of trees in the island, there

remain nearly 11,500,000, producing 460,000,000 of nuts for other purposes, many millions being exported or made into copera." The number of trees seems to have been rather over estimated, judging by recent agricultural returns. (*Vide* ch. v.)

Oil is extracted from the dried kernels of the nut by pressure in mills of various sorts, the native contrivances for this purpose being of the rudest description turned by oxen; and there is an extensive steam factory belonging to Europeans at Hiltsdorf near Colombo. After the kernels are removed from the shells previous to the oil being extracted, they are dried in various ways, being usually spread on slight wooden frames. Cocoa-nut oil is only liquid at a high temperature of the air, such as prevails where the tree grows, when it is of a bright amber colour, and coagulates at from 70° to 75° Fahr. Enormous quantities are used in England for making stearine candles. Cocoa-nut oil when newly made is used for cooking by the natives, but it rapidly assumes a very disagreeable flavour and odour; it is composed of cocoa-stearic acid, and oleine.

The cake, called poonack, left after the oil is extracted, is used for feeding poultry, and also exported to Europe. The kernels when dried for exportation are called copera, a word derived from the Hindu "khopera." It is found that the nuts yield most oil when pulled before they are quite ripe.

In 1867 the quantity of Oil exported was—	
To England	100,114 cwt.
To India	6,462 „
Other countries	1,543 „
Valued at £134,540.	
Total	108,119

The Copera exported was—	
To England	17,379 cwt.
Other countries	5,923 „
Valued at £13,981.	
Total	23,302 ¹ „

Coir is a fibrous substance that surrounds the nut-shell, lying between it and a thin outer skin, forming a kind of packing, and making the whole very light in proportion to its bulk.

¹ Sessional Papers, 1868-9, lxiii. ; 1871, lxiii.

Some writers suppose it is so arranged in order that the nut may float on the waves and be thus disseminated among ocean islands ; but another and more probable reason why it is so formed has not been noticed, namely, in order to prevent the nut-shell bursting in its fall from the tree, very likely to happen without this protection, being large and heavy, usually flying off with a rebound when it reaches the earth ; however, it is admirably arranged for either purpose.

The greenish, half-ripe nuts produce the best coir, the fibre in the old ones being brittle and hard. Coir is prepared by soaking the husks in water or damp pits for some time, after which they are washed and beaten with heavy wooden mallets to separate the fibres from a cellular substance that surrounds them, and then dried in the sun. At Calpentyn and other places the husks are buried in the margin of salt lakes and marshes, where they are left several months, being dug out clean and in better condition than when steeped in fresh water, which not only injures the coir, but causes an unpleasant effluvia, and is considered very unwholesome. The number of nuts required for one pound of coir varies from three to seven.

Coir ropes and cables are very light, almost floating on the water, and exceedingly elastic, but more durable in salt water and warm climates than in fresh or very cold climates, when they are apt to break suddenly. Besides the immense quantities consumed in the island for rope making and other purposes, more than 2000 tons are annually exported to England and India.

In 1867 the Exports of both were—

To England	41,077 cwt.
To India	5,234 „
Other countries	3,080 „

Valued at £33,842.

49,391

Toddy is obtained from the long flower bud (which is enclosed in a sheath) by tying it soon after it appears in three places to prevent its expanding and the point cut off ; it is then beaten with a hard wooden mallet to crush the flowers inside and promote a flow of sap, bent downwards and fixed in that

position. After a few days a round earthen vessel is suspended underneath to catch the liquid as it drops from the bud, a thin slice being cut off the point every day. A good tree will yield from four pints daily; after a few months the drawing is stopped, as it exhausts the tree very much.

The best time to drink toddy is early in the morning, being, then less intoxicating and more agreeable than when stale, as it ferments rapidly, three hours being sufficient to set it going, and after a day or two is quite unwholesome. Both European soldiers and natives who drink it in this state become very drunk and troublesome under its influence. The evil effects are much increased by the addition of drugs, both the toddy and arrack sold in the bazaars being adulterated with datura and bang, or hemp seeds, opium, nux-vomica, fabia amara, and cocculus. In 1872 a law was passed imposing a fine of five rupees on drunkenness, and fifty rupees for adulterating toddy and arrack. In India this drugged stuff is called "Pariah arrack."

The taste of toddy is peculiar and difficult to define; it has been compared to champagne, cider, or milk, and recommended by Rumphius for consumptive patients; but it is very doubtful a doctor in the island would think of recommending it for anything. The English term toddy is supposed to be derived from *Tari*, the Tamil and Hindu name for the juice of the palmyra palm. The Sinhalese call it mee-ra and suri, from the Sanskrit for palm wine. The word *Shechar*, so often recurring in the Talmud, generally translated as strong drink, and once in Numbers (xxviii. 7) as strong wine, means in reality the sweet liquid drawn from some of the palms, and was very probably drugged by the Jews, the adulteration of liquids to increase their intoxicating power being quite an Eastern habit. Ralph Fitch and other travellers mention that the Persians put dried raisins into palm wine to make it stronger; and Linschoten describes a compound of raisins and arrack made at Goa "as excellent an aqua vitæ as any from Dort."

Toddy is drawn and cocoa-nuts gathered by men who form a distinct caste: they are often a drunken race, given to indulgence in the liquid, usually receiving a little of it and of

the nuts instead of a money payment. Their implements are a wooden mallet, a knife, and a chattie, suspended from the waist. When mounting palmyra trees, whose trunks are very rough, they wear a piece of leather on their breasts to protect them, which is not required for the smoother cocoa-nut. Before they climb their ankles are tied together with a band of leaves or a rope, leaving a few inches interval between them, which, catching the projections on the trunk of the tree, formed by the leaves as they fall off, sustains the man while he raises his arms and clasps the tree to draw himself up a short space. When a number of trees are growing close to each other they are connected by ropes at the top, and the men pass by them from one tree to another; it is rather a dangerous employment as they sometimes fall, six deaths being recorded from this cause in one year. Pliny describes the climbing of date and palmyra trees (lib. xiii.). The cocoa-nut was unknown to him.

Toddy is used for leavening bread, there being nothing better for this purpose; it also makes very good vinegar, and when distilled yields the white spirit called arrack, and jagery is made from it by boiling in the same manner as from the palmyra. Cocoa-nut toddy is not so rich in saccharine matter, but is better suited for distilling. One-third part of rice and some sugar is usually mixed with it. Newhoff says the Dutch added oil of cloves. The export of arrack from Ceylon has greatly increased of late years, amounting in 1867 to 90,158 gallons, valued at £7,574.¹ Three kinds are known in commerce—Goa, Batavia, and Colombo.

It has been suggested that sugar made from the cocoa and palmyra palm would be a profitable speculation, jagery, when refined, yielding sixty per cent. of a fine-grained sugar superior to that of the cane. Others say this is a mistake, for although a native proprietor of a few palm trees can make jagery in his household at a very cheap rate, it could not be manufactured by a European planter for less than double the price, and that it would be dearer than cane-sugar. Drawing the liquid from the trees is a tedious and rather expensive process by hired labour, as a man cannot draw more than twenty trees in a day.

¹ Sessional Papers, 1868-9, lxiii.

The large importation of cane-sugar from India and the Mauritius shows that jagery cannot compete with it. In 1867, 12,294 cwt. of unrefined sugar, valued at £15,368, and 3666 cwt. refined, valued £8249, subject to import duties of 2s. 6d. and 5s. per cwt., were imported into Ceylon.

When pulled before they are quite ripe the kernel of the cocoa-nut is soft and like *blanc mange*, but rather insipid, and eaten with a spoon. There is also a quantity of very agreeable liquid containing 95 per cent. of water, the remainder being mucilage, glycine, albumen, and oil. When quite ripe it has a hard astringent taste and is much less in quantity; at a further stage of maturity the fluid disappears, and the hollow is filled by a round interior kernel, which is the germinating organ, the nut is then of little use for any purpose but planting.

Nuts are husked by driving a strong stake of wood into the ground, leaving a couple of feet projecting above it, which is then pointed, a man taking a nut in both hands drives the stake into it, then bending it sideways, the husk is torn off in pieces.

In 1842 only 550 nuts were exported from the island, but now they exceed four millions and a half, chiefly to India.

In 1867 the number exported was—

To England	46,150
To India	4,348,866
Other places	173,865
	<hr/>
	4,568,881

Valued at £13,646, or about £3 per 1000.

The cocoa-nut appears to have been unknown to the Greeks and Romans. Marco Polo and other mediæval travellers call it *Nuces indica*, by which name it was then generally known in Europe. The modern cocoa is supposed to be derived from the Latin *cocus* (a shell). The Sinhalese call it "Pol," the Hindus and Persians "nargil," from the Sanscrit "narakela," and the Arabs "jouz Hindi." The Sinhalese profess to distinguish several varieties, only one of which is discernible to the eye of a stranger, the "king cocoa-nut," as they name it,

which is much smaller than the others and of a bright orange-brown, but it is not so good a nut as the ordinary one.

A variety of the cocoa-nut palm (*Lodoicea Seychellarum*), which grows only in the island of Praslin, one of the Seychelles, produces the wonderful double nut formerly known as the "Maldive-nut," from the circumstance of its being carried by the waves and thrown on their shores. Before the discovery of the Seychelles, in 1759, people in ignorance of where they came from, thought them a produce of the sea, and that they grew under the water, hence one of their names, *Coco de mer*—it was also named *Coco de Solomon*, and the *Nux medica*, from its supposed medicinal properties, being deemed a sovereign remedy for flux, apoplexy, scurvy, poison, &c., and in consequence of their rareness, being only occasionally picked up on the Maldives. The most extravagant prices were demanded for them, Rodolph the Second offered 4000 florins for one and could not obtain it. The Abbé Rochon, who travelled in Madagascar in 1768, says in the year the Seychelles were discovered they were sold for £400 each.¹ Linschoten (1584), remarks "the maldive-nuts are good against all poisons, and cost 300 pardawen; one was sent to the king of Spain."² Ibn Batuta, who was in the Maldives (A.D. 1344) says, the chief revenue of the Sultan was derived from the sale of nuts and other objects thrown on his shores, which were jealously guarded.

The tree on which this remarkably shaped nut grows is a fan-leaved palm, about fifty feet high; the nuts are of an immense size and dark colour, holding from six to eight pints of liquid, but their flavour or other properties are in no way different from the ordinary nut. Thunberg mentions that one was growing as an exotic in the Governor's garden at Grand Pass, Colombo, and some attempts have been recently made to introduce the plant into the island.

Cocoa-nut planting.—The prolific yield of the cocoa-nut tree, and the increasing demand in Europe for the oil, has induced some capitalists to embark in their cultivation, and many thousands of acres have been planted by them. Batta-

¹ Pinkerton, Coll. Voy., xvi. 807.

² Travels, p. 23.

caloa is one of the best parts of the island for the purpose, here they obtain what they require, a sandy soil saturated by salt water, at no great depth from the surface, a high temperature, and a moist saline atmosphere. Since 1832, when the first European plantations were made there, the sand-banks which border the lagoons have been covered by cocoa-nut trees, "said to produce the finest and most numerous nuts in Ceylon."¹

An acre of cocoa-nut trees produces on an average from four to five thousand nuts per annum, worth from £12 to £15, at about £3 per 1000, and several calculations have been made of the profits from cocoa-nut plantations, which have proved rather fallacious, as experience shows the plants require much care in their infancy, and have a great enemy in the shape of a beetle (*Oryctes rhinoceros*), who eat their way through the trunks, destroying from one-tenth to a quarter of plants annually, which require to be continually renewed. (*Vide* ch. xxvii.) The most effectual remedy that has yet been discovered is to catch the larva with a small barbed spear thrust into the holes they bore in the trees. The plantations also require to be guarded against wild pigs, porcupines, rats, and elephants, who are very fond of the young leaves.

The number of trees planted on each acre has been variously estimated at from fifty to seventy-five and one hundred. The Dutch made some calculations in 1740, which show that from forty to fifty roods of ground on the coast between Calcutra and Colombo, where they are very close, contained 1000 trees, which would make 80 per acre.² The nuts are first planted in a nursery, being placed in squares of several hundreds, and then covered with a layer of sand or mud, mixed with sea-weed if possible, and watered daily until they sprout; in five or six months they are fit for transplanting, being then placed in holes, filled with sea-weed or sand mixed with salt, from twenty to thirty feet apart, according to the locality. Too much crowding is injurious. They require constant watering

¹ Tennent.

² Van Imhoff's Report in Lee's App. to Ribeyro, p. 171; Simmons, Colonial Products.

and shading from the sun for two or three years, and an occasional application of salt or other manure until the flower appears.

In some native plantations where the trees are left to take care of themselves, the period of flowering is much later than on those of the Europeans, who find that by the application of manure, such as fish, ashes, saline mud, and oil-cake, they can be made to flower about their fifth or sixth year, likewise the produce of nuts can be more than doubled by the same means.

CHAPTER XXXIII.

CINNAMON.

It is a strange circumstance that Ceylon, which De Barros calls "the mother of cinnamon," and has been considered among moderns as pre-eminently "the cinnamon isle," should not have been once mentioned by ancient authors as producing this delightful spice, which, Galen says, was a "fitting present for kings and emperors." Most writers, including Theophrastus, "Periplus," and Cosmas, describing it as a product of Arabia or Ethiopia. Dr. Vincent, in his "Commerce of the Ancients," says "he could find no allusion to Ceylon cinnamon among the authors of antiquity, unless Dionysius was referring to it in his poem on the Erythrean Sea, when he says:—

"At aves ab alia parto, de insulis desertis.

Advenerunt afferentes integri cinnamomi folia."—*ver.* 940.

Eustathius, Archbishop of Thessalonica (A.D. 1198), the poet's learned commentator, seems to have thought the spice came from Arabia, having no idea it was a produce of Ceylon. .

It is supposed that oriental spices must have been imported into Egypt at a very early period to be used in embalming mummies. In Exodus, ch. xxx. 23—24, cinnamon and cassia are mentioned in such quantities that they could not have been very rare or difficult to obtain, and the quantity of cinnamon used at Poppæa's funeral by Nero, proves it was plentiful at Rome also. Galen says cinnamon and cassia were so much alike it was not easy to distinguish them. The spice as known to him appears from his description to have been small sticks with the bark on.¹ Cinnamon is not mentioned by Homer,

¹ Lib. xiv. 515.

although named in the Bible long before his time—in Exodus xxx. 23, in Proverbs vii. 7, and in the Canticles iv. 14. The terms used in the Talmud for cinnamon and cassia, "*khenoh*" and "*kiddah*," both seem to be derived from the pipe-like form of the spice.

The Arabians informed Herodotus¹ that they obtained cinnamon in marshes guarded by winged serpents, and in the nests of birds. He says the birds made their nests of cinnamon sticks fastened together with mud, and that the Arabians did not know where the sticks came from. It is supposed, with great probability, that the Arabians invented these fables in order to prevent travellers and others from finding out where they obtained the spice, and thus spoil their trade. Pliny dismisses the story of Herodotus and gives one of his own: according to him cinnamon did not grow in Arabia, but came from Ethiopia, the bark being brought with great difficulty across the sea by vessels sailing about the time of the equinoxes, when a S.E. wind blew. It was never gathered without the permission of a god, supposed to be Jupiter. The Ethiopians sacrificed forty-four oxen and goats for leave to cut it, but after all they were only allowed to work before sunrise." (xii. 42.)

Eratosthenes, librarian of Alexandria (B.C. 194), Hipparchus, and Ptolemy place the cinnamon region in the north-eastern corner of Africa or Cape Guardafui. Strabo draws a fanciful parallel to indicate the "*Regio cinnamomifera*," or countries where the spice was supposed to grow, passing on one side a little to the south of Taprobane, and at the other across Lybia. This author, quoting Aristobulus, says "the meridional part of India produced cinnamon and all the spices of Arabia, and, according to some, the greatest part of the cassia came from India."²

"Periplus," which describes ten kinds of cinnamon known to commerce at that time, mentions that cassia was obtained

¹ L. 3, iii. 205.

² Lib. ii. 80, 132; lib. xv. 694; the Geog. Dict. of La Martinere, Amsterdam, 1730, and the French translator of Ribeyro, both say Strabo states Ceylon "porte beaucoup de canelle," probably on the strength of the above statement.

in large quantities at Mosyllon, the centre of the African trade, and also a finer kind of cinnamon. Mr. Cooley traces the name of Cape Guardafui to Kardufan, an Arabian term for the spice, and contends that the cinnamon brought to Europe by the Arabs came principally from the north-eastern part of Africa.¹ Bruce, the African traveller, says cassia grows plentifully on this Cape, but botanists say African cassia has very little aroma,² and it seems to be very doubtful that true cinnamon ever grew there. According to Garcia da Orta (i. xv.) the Portuguese could find no trace of either cinnamon or cassia in Ethiopia or Arabia when they were there in the sixteenth century. The African spice trade is supposed to have declined about the sixth century with the decay of the Roman Empire.

Marcus Aurelius is said to have had at Rome a cinnamon plant seven feet high which was brought as a great rarity from Barbaria on the eastern coast of Africa according to some commentators, and from Barbake in India according to others. With a few exceptions mediæval writers and travellers are also silent about Ceylon cinnamon. Sir W. Ousley, quoting a manuscript Persian dictionary called "*Berhan Katta*," which has, Sailan the well-known region from which is brought the fine cinnamon, says, "it has been doubted from the silence of Pliny, Ptolemy, Dioscorides, and other early writers, whether cinnamon, which in the dictionary quoted seems particularly indicated as a staple commodity of Ceylon, was known among its ancient products. The Persian name *Dar-chini* bespeaks a different origin, but according to Texiera it was called *Dar-clini Seylani*, merely to describe it as a substance exported from Ceylon by the Chinese. It would be interesting to know how long the spicy bark has borne the name of 'Chinese wood' which is mentioned in Makktari, a Persian poet of the eleventh century. I cannot recollect any passage wherein this spice is named by writers of the eighth, ninth, and tenth centuries."³ Mas'udi (A.D. 915) enumerates thirty

¹ *Regio Cinn.*, p. 14 ; J. G. S., xix., 1849. 8

² *Trav.* i. 381.

³ *Trav.* i. 40, 41.

aromatic plants said to have sprung up in India from the leaves which covered Adam's body when he was cast out of Paradise, but cinnamon is not one of them.

The Greek kinnamon and the Latin cinnamomum, Theophrastus says, came from the Phœnicians, who are supposed by Dr. Marshall¹ to have derived the term from two Malay words *Kaya manis* or *Kulit manis*, meaning sweet wood; but Mr. Cooley says the only consistent derivation of the wood cinnamon is chin or Chinese amomum, an etymology preferred by Garcia and other Portuguese writers. The Arabian, Persian, Armenian, and some of the Indian names for the bark, such as *dar-chini* and *dar-sini*, are also said to be of Chinese origin. Nees von Esenbeck says the Arabians distinguish two kinds of spice, the fine being named kardufan or kardu, and a common sort called dar-sini.² It is a question whether these names are not in reality derived from the Sanskrit "*daru-sita*," meaning literally a stick of cinnamon or cinnamon wood, which, as well as *tamala patra*, another name for one of the aromatic laurels. The Tamil *karua*, and the Sinhalese *kurundu*, seem to be aboriginal terms, several species of inferior cinnamon being indigenous in western India. The Chinese themselves call cassia "kwei," and cinnamon "yoke kwei," and "jaw kwei." De Couto and other Portuguese writers considered the Chinese among the first eastern navigators who traded in cinnamon, which they carried from Ceylon to the ports of Arabia and Persia.³ Cassia grows abundantly in China, and they probably brought it with them, but it is doubtful if real cinnamon is found there, although Spielman says it grows in Tartary; and is also said to be found on the Shan hills on the Burmah frontier⁴ and in Cochin China. There is no mention of it in Osbruk's "*Flora Sinensis*" as belonging to China proper.

¹ *Annals of Philos.*, 1817, x.

² "*De Cinnamomio Disputato*," Bonn, p. 3.

³ "E como os Chins formam os primieros que navegaram pelo oriente, tendo noticia da canella acudêram muitos 'juncos' aquella ilha (Ceylon) a carregar della, e dalle a levaram aos portos de Persia, e da Arabia donde passou á Europa." —*Da Asia*, dec. v. 1, 50; Garcia Da Orta, *Aromatics of Ind.*, lib. i. ch. xv. In Beal's *Fa Hian* oil of cinnamon is named as being in use in Ceylon; but it does not appear in Julien's version.

⁴ J. A. S. Beng., 1862, p. 288.

Khordadba in his "Book of Routes" (*vide* ch. xi.) says the Jews brought cinnamon to Persia from China; and Mr. Cooley surmises that it may have reached India in ancient times overland by Persia, quoting Marino Sanuto, who in the fourteenth century speaks of a trade from the side of the Tartars by Bagdad and Tabrez, whence were brought spices of value, but weighty articles, such as canella, came overland.

Kazwini (1275) is the first writer who mentions Ceylon cinnamon (*vide* ch. xi.); and the first native notice of a trade in this spice occurs about 1406, when the Chalias are stated to have been organized by the kings for the purpose of furnishing him an annual supply, which Barbosa one hundred years after mentions he sold to merchants from India. Sir E. Tennent says, "although cinnamon is named in several ancient Sanskrit works on medicine, and in one called *Sinhalem*, which implies it came from Ceylon, it is rarely mentioned in Sinhalese writings."

Some have doubted that the cinnamon laurel is indigenous in Ceylon. Sir E. Tennent suggested that perhaps it was brought to the island along with the coffee plant by the Arabs from Africa; and D'Herbelot supposed from the absence of any allusion to it as a product of Ceylon in oriental geographies that it did not grow there formerly, but was introduced by the Chinese, accounting for its being called *dar-chini*; ¹ however, several kinds grow wild in the island, some being found at an elevation of 8000 feet, but yielding an inferior bark, such as *C. ovalifolia*, *C. villosum*, *C. multiflores*, *C. perpetuoflores*, all figured in Wight's "Icones," from specimens procured in the jungles by Colonel Walker in 1888. Mr. Thwaites of the Botanical Gardens is of opinion "they are only varieties of *C. Zeylanica*," although so different in the shape of the leaves. Seeds are carried and dropped by birds, who are very fond of them, and the number of plants scattered through the S.W. jungles increase yearly from this cause. *

According to Crawford, "the true cinnamon plant is not a native of any part of the Archipelago nor Uochin China,

¹ Bib. Orien., Tennent, i. 603.

although an inferior species grows in most of the islands, and Ceylon cinnamon has latterly been cultivated with some success in Java and Malacca," and it seems to be certain that it is not indigenous in any other place than Ceylon. It is not improbable that if originally introduced from some other country, there is something in the air or soil about Colombo that has changed its nature, making it a peculiar species; developing those qualities which make the bark obtained from trees growing in this neighbourhood superior to all others. Here it obtains what it seems to require—a hot damp climate, heat above, and plenty of moisture below, the ground being surrounded by lagoons and lakes which saturate the sub-soil.

There are no plants and their produce about which there has been so much confusion as the aromatic laurels. Since the time of Theophrastus and Pliny cassia and cinnamon have been constantly confounded as products of the same tree. To an ordinary observer there is very little difference in the appearance of cassia and the various cinnamon plants, but when the barks are tasted the cassia will be found to be harsh and bitter, while cinnamon is sweet and agreeable; also, on a close examination* cassia differs in many particulars—the leaves are oblong lanceolate, while those of the true cinnamon are broad, which is the chief distinguishing feature between it and other varieties of the plant. Cassia bark when dried bears a strong resemblance to coarse cinnamon, only it is thicker, darker, and rougher, and there is little difference in the amount of aroma; but analysis shows their chemical constituents are different, cinnamon containing a principle of tannic acid, which is not in the other. A decoction of cassia yields a blue colour (iodide of starch) on the addition of tincture of iodine, but cinnamon does not.¹

Cassia is not found in Ceylon, as often stated, but there is a tree called dawl kurundu by the natives, the *Litsæa zeylanica* of Nees von Esenbeck, erroneously called *Laurus cassia* by Linnæus. Dr. Wight has shown that no less than three species of laurel were included by the great naturalist under one name. This tree is more branchy and irregular than other

¹ Pereira, Mat. Med.

varieties of laurel, with shorter and narrower leaves, of a dull green colour and blackish berries, with a very bitter bark, and is never cut for spice. Rumphius remarks that trees which produce cinnamon, cassia, and clove bark, although so much alike, are rarely if ever found in the same country. There are several sources of cassia bark besides the *C. aromaticum* of China, the real *Laurus cassia*, and many varieties of cinnamon in different parts of the world. Dr. Wight, who gives drawings in his "Icones" of fourteen kinds, says, "there are no fewer than four distinct species on the Malabar coast and twice as many in the Archipelago, all remarkable for a strong family likeness and endowed with aromatic properties."

Malabar cinnamon, which yields a very coarse and inferior bark called "canella grosso" by Di Conti and the Portuguese, appears to be almost identical with one of the wild varieties of Ceylon. Garcia says Ceylon cinnamon exceeds Malabar in value as four to one. Tillicherry or Bombay cinnamon most resembles the finer bark of Ceylon, though inferior in quality, and is the produce of *C. iners*. Buchanan says it grows in great profusion at Cochin and other places along the western coast, also in Mysore.

Besides these sources of aromatic bark, there is the clove cassia of Brazil (*Dicypellium caryophyllatum*) and the *Nectandra cinnamomioides*, which forms large forests at Santa Fé, in Mexico, noticed by Pizarro in 1540.¹ Sir R. Schomburgk found a species in 1772 growing on a soil similar to the cinnamon gardens of Colombo, and a variety is found in the Isle of France (*Oreodaphne cupularis*). The dictionary De Trevoux mentions a bark from Madagascar formerly brought to Europe resembling cinnamon with a taste of cloves, called canelle girofle ou noix de Madagascar; but it is a question whether it really came from the island, being more probably what is called massoy bark in India, a kind of cassia in flat pieces tasting like cloves, the bark of *C. culilawan*, Blume, from Amboyna.

It has been stated by several writers that the plantations at Marendan near Colombo were formed by Faik, the Dutch

¹ Prescott, ii. 138.

governor about the year 1766,¹ apparently on the authority of a statement in Thunberg, who visited the island in the year 1777, and says, "Falk planted some cinnamon seeds in his garden at Grand Pass in 1769, with the intention of forming an experimental plantation there, which being opposed by the natives who said planted cinnamon would not answer, they came at night and poured hot water on the young seedlings which killed them; but the governor found the trick out, and planting some more succeeded in rearing them." Thunberg makes no mention of planting at Marendan, or anywhere else about Colombo, but speaks of it as having an established reputation for producing the finest cinnamon in Ceylon,² although he says some trees were planted at Sitavacca on the borders of the Dutch territory, and a few at Caltura and Matura. "He was occupied one day examining the spice sent from the interior by the King of Kandy, which was generally of a very bad quality, acrid and biting, more than half of it being thrown away."

"All that was ever done in the grounds about Colombo by Falk and the Dutch, was to drain some portions and clear away the low jungle, so as to admit air and light round the plants; nothing further appears to have been done until the island had been in British possession for some years, when large tracts of cinnamon land which had become swamps were cleared and drained, and vacant places filled up with young plants, the produce of which rendered cutting cinnamon in the uncleared jungle portions about Colombo and Galle no longer necessary. There appears little doubt it was the abundance of cinnamon of the best quality, growing on the light soil of the western coast, which induced the Portuguese to settle at Colombo."³

Sir E. Tennent remarks, "Long after the arrival of the Europeans, cinnamon was only found in the forests of the in-

¹ Cooley remarks, "the cultivation of cinnamon is not yet a century old."—*Regio Cinn.*, p. 15. *Vide also* Tennent, i. 602.

² "Le terrain sablonneux qui longe la côte nommée Marendan produit la meilleure cannelle de tout Ceylon."—*Trad. Langles, Paris, 1796*, ii. 406, 414. Girardin says "Ceylon produced five sorts of different quality, all growing without cultivation."—*l. i. 2v.*

³ *Copper, J. E. A. S., 1846, 1856.*

terior, cut by Chalias, originally weavers, who took to the new employment, and so difficult of access were the forests that the Portuguese only obtained it once in three years, and the supply was very small" (i. 602), and in another place he states that "the Dutch encouraged the growth of cinnamon near their forts in order to render themselves independent of the kings of Kandy, harassing the Chalias and even cutting down the trees in their dominions, being a favourite mode of annoying the Europeans."

Van Goens, the Dutch governor in 1668, only seven years after their capture of the island, speaks of the profusion of cinnamon at Negumbo, which was the finest in the world,¹ and it has been seen in Ch. XII., that most of the travellers about the time of the Portuguese mention its abundance. Di Conti says the sticks when peeled were used as firewood, and Baldeus that they were burnt in his kitchen at Galle, growing along the coast as far as Chilaw. Cæsar Frederick, who visited Colombo in 1568, represents it as being found among other trees on the site of the present plantations; and Ribeyro gives seemingly an exaggerated account of its profusion, forming, he says, an underwood (*matos*) at Chilaw, and right across the country to the frontiers of Uva down to Tanavare. It was so luxuriant at Chilaw and the forests so dense, no man could pass through them on foot; although this was in the domains of the King of Kandy, he states that there were 10,000 hamlets in the Portuguese territory where the spice grew.²

The manufacture of cinnamon was originally a monopoly, successively in the hands of the native, Portuguese, Dutch, and English governments, and during the time of the Dutch the plant was jealously guarded. When the British obtained

¹ "Nigumbo was in de beste cancel landen geleegeen—alwaar de allerbeste aneel groeide van den *geheelen bekenden aardbodem*; ook en zeer groote quantiteit."—Valentyn, v. 149, 166.

² "Que todas as mais terras de Chilão cortando parte do Reino de Candia, e fronteiras de Uva, até duas legoas adiante Tanavare, todas ellas são de canilla," lib. iii. c. viii. "Quasi todos as suas terras são os matos de canilla, e comprehendem de Chilão duas legoas adiante do pagode de Tanavare, os matos de lá são tão fechados, que hum homem não he possível andar por elles hum tiro de pedra."—Lib. i., ch. iii., *Noticias de Nações Ultramar,* vol. v.

the island, the trade was in a declining state, and the plantations about Colombo much neglected; they also found that the spice was growing in small patches in many private gardens of the Colombo district belonging to natives, no doubt originating in the time of the Portuguese, who imposed no restriction on them, but the Dutch declared these trees the property of their company,¹ and not only claimed the right to peel the cinnamon, but severely punished the proprietor or any person, other than the company's servants, if they peeled a stick or destroyed a plant. The British inherited this system, and although its rigour was much relaxed, there were continual contentions between the government and the native proprietors, who never lost an opportunity of rooting up the obnoxious trees growing in their gardens, which they were not allowed to peel, the government agents being unable to watch so many small properties scattered through the province. In 1833 an order was received to abandon the monopoly and gradually dispose of the government stock of cinnamon and gardens, a measure condemned as too sudden a change from one system to another.

For more than 500 years Ceylon supplied nearly the whole of the cinnamon used in Europe, but in the early part of this century the trade declined in consequence of the increased consumption of cassia, and cheaper though inferior cinnamon largely introduced into the market from other places. In 1843 2,470,502 pounds of cassia and coarse cinnamon were exported to England from India and the Archipelago at from 80s. to 105s. per cwt., according to quality, and these cheap barks threatened at one time to drive the Ceylon out of the market.

When the government monopoly was abolished in 1833 a very high export duty of 3s. per pound on all kinds was imposed, considerably exceeding the cost of production; the trade, already declining, burthened with this additional tax, was for a long time in a very depressed state, and ran a risk of being destroyed when the abolition of the duty in 1845 saved it, and

¹ "By Dutch law, every tree of cinnamon which grew even by chance on private property became confiscated to the State; if the proprietor destroyed it he became liable to capital punishment."—Letter of Mr. North, Wellesley MS., Brit. Mus., No. 13,865.

led to a revival, being now again in a fair way. The duty had been previously reduced in 1837 to 2s. 6d., in 1841 to 2s., and again to 1s.

The competition with other countries, and reduction of price, has caused less care to be taken of late years in preparing the finer qualities of bark for exportation in Ceylon, old and coarse shoots being peeled in a larger proportion; consequently although the total quantity exported has greatly increased, the quality has deteriorated so much, there is now no cinnamon to be had equal to that obtained formerly, and people have been gradually induced to be satisfied with a cheap substitute. This coarse cinnamon is now produced in such quantities that cassia is being driven out of the market by it in turn, in 1866 the import of cassia to England having fallen off to 349,000 pounds at £3 4s. 7d. per cwt.

According to the "Reports of the Juries Exhibition of 1851," Ceylon cinnamon is superior to all others; it says, "this product is at present confined to the continent of India and the Archipelago, whence various samples are sent, none however equal to that of Ceylon. . . . Malacca and Java both exhibit inferior cinnamon, Bengal cassia is of very fine quality and sold in Calcutta for Ceylon, the cases having a few sticks of the latter spread on the top." As a proof of the superiority of Ceylon cinnamon, according to Bennet in 1825 some plants were smuggled out of the island in a Dutch brig, commanded by an Englishman, and taken to Java and thence spread through the Archipelago; it is also said to have been planted in the West Indies at the end of the last century, and Lamarck in a note to Langles' edition of Thunberg says it was introduced into the Mauritius in 1796.

According to Dr. Pereira, the principal consumers of cassia and coarse cinnamon are the chocolate makers of continental Europe and Mexico; he says he was told the Germans, Turks and Russians prefer cassia to cinnamon, which is not strong enough for them. "Four kinds of cinnamon are known in the London market, Ceylon, Tillicherry, Java, and Malabar or Madras. Cayenne is peculiar to the French market."

In 1691, 375,000 pounds of cinnamon from Ceylon were im-

ported into Amsterdam at 4s. 6d. per pound; during the eighteenth century the average annual imports were about 480,000 pounds, the highest prices ever known occurred between 1753 and 1787, when it rose from 8s. 4d. to 17s. 8d.¹ The small revenue compared to the price of cinnamon derived by the Dutch (only £12,000) was probably owing to the speculations of their governors. (*Vide* ch. xvi.) When their own supplies were not sufficient, the Dutch bought the spice from the King of Kandy at 20s. per bale of eighty-eight pounds, partly paid for in salt, and they, as well as the Portuguese, frequently burnt quantities to keep up the price.

The British revenue during their monopoly varied from £50,000 to £97,000. The average exports were

From 1804 to 1808 . . .	4,083 bales.	|	From 1815 to 1821 . . .	5,000 bales.
„ 1809 to 1814 . . .	4,567 „		„ 1821 to 1831 . . .	3,500 „

From 1835 to 1846 the average export was about 500,000 lbs.; in 1835 the price was 9s., and in 1846, 4s. 2d. In 1862 the quantity exported was 875,475 lbs.; in 1867, 1,017,750 lbs., valued at £50,887. In 1868 the export was exceptional, 2,056,509 lbs.,² valued at £102,825, or 1s. per lb. The average price in London since 1866 has been 1s. 9½d. Cinnamon was analyzed by Vauquelin in 1817, and found to contain a volatile oil, tannin in large quantities, mucilage and colouring matter with a peculiar tannic acid.

One of the principal plantations is near Negumbo, and two in the vicinity of Colombo, occupying several thousand acres, and presenting the appearance of laurel plantations, growing on a plain of quartz sand as white as snow, but this only covers the surface to the depth of a few inches, the subsoil being a grey sand resting on extensive beds of marine shells. Dr. Davy found on analysis that the soil contained 98·5 per cent. of silicate sand, 0·5 vegetable matter, and 1·1 per cent. of water. Mixed with the cinnamon plants are various larger trees, bread-fruits, cashew-nuts, and jambos, while several roads running through them form a pleasant drive in the evening, when the soft cooings of numerous

¹ Lee's Ribeyro, Appen.

² Reports in Blue Books, 1870, vol. xlix.

turtle and cinnamon doves are heard in the distance, giving place at night to the yell of the jackal hunting in packs.

After allowing them to be overrun with jungle and covered with ant-hills and parasitical plants, the Government in 1840 tried to sell them in lots, but in consequence of the depression in the trade, from 4s. to 10s. per acre was all that was offered in response to the proposal. Some years later £15,000 was obtained for the greater portion, or about £1 5s. per acre. The Negumbo plantation contained 5,137 acres, and Marendan, 3,824; there were also some smaller plots at Pantura, Barbeyrin and Galle. The purchased portions are now in a fine condition; among the recent improvements is the application of manure, which is said to have raised the produce of an acre from fifty to 350 lbs.¹

The true cinnamon (*C. Zeylanica*), is a branchy tree growing naturally to a height of twenty or thirty feet, covered with a rough ash-coloured bark, which in the young shoots is speckled with dark green and orange brown spots; the young leaves are scarlet with yellow veins, changing with age to a deep glossy green, and the flowers, which have a very disagreeable odour, are white, having a six-cleft corolla and nine stamens, producing an oval purple berry the size of a black currant, fixed in a cup like an acorn: they have a slight taste of turpentine, and are a great favourite with pigeons and other birds. The blossoms come out in January and February, and the berries are ripe in August. The roots have a pungent smell of camphor, and the leaves when crushed in the hand a strong aromatic odour. The plant is stated to be remarkable for its longevity, some trees planted more than 100 years since being in full vigour yet.

Cinnamon requires some shade, and a few large trees planted among them are desirable; little cultivation is required beyond cutting down the larger branches to produce a fresh growth of straight shoots for peeling, which spring up like those of hazel; plants are produced from seeds either sown in a bed for transplanting, or dropped into holes made with a hoe, having a small quantity of wood ashes in each for manure. In six years they

¹ Capper, J. R. A. S., 1856; also new series, i. 42.

are about five feet¹ high and fit for peeling, but a good crop is not obtained before nine years.

Cinnamon is usually cut for peeling when the young leaves are beginning to turn green, and after the heavy rains in May have filled the plants with sap and softened the bark. The shoots are cut as much of a size as possible, or about two inches in circumference, then tied in bundles and left in heaps until a slight fermentation takes place, facilitating the separation of the bark, which is accomplished by cutting it lengthways with the point of a knife and removing it with the fingers.¹ The bark is then placed on a round piece of wood, and the outer green cuticle scraped off with a knife, the workman sitting on the ground and holding one end of the stick in his toes, after which the bark is dried in the sun, and the smaller quills placed inside the larger ones. When dry it is formed into bales covered with gunny cloth, from 85 to 92 lbs. weight, broken pieces being put into boxes or used for distilling oil of cinnamon.

When new cinnamon has an exquisite flavour, a good deal of which it loses in a few months, so that persons in Europe never taste it in perfection; great diversity exists in the flavour of the bark from the same plant, arising from the care or skill in the preparation, the nature of the soil, the age of the trees, the amount of shade, &c. Persons experienced in the business, can tell the quality from the appearance of the bark, but it is usual to chew a small quantity to ascertain it, which is a disagreeable office, as it takes the mucus off the lips and tongue; the best quality should melt in the mouth, and be little thicker than stout paper. It is remarkable that cinnamon will not retain its fine aroma during a long sea voyage in the hold of a vessel, unless a number of bags of pepper are placed between the bales; also the mixture of bales of coarse and fine cinnamon is injurious to the aromatic property of the latter. The Portuguese and Dutch tried the experiment of placing coir between the bales, and also made

¹ Cæsar Frederick and other travellers mention "that the bark was taken off the trees (shoots) while growing." A manner of peeling formerly practised by the Chalias.

them up in cow-hides, which answered tolerably, but it is said there is nothing so good as pepper.

The cutting and peeling is performed by a distinct caste of men called Chalias, whose organization for this purpose is described in Ch. XVI. In 1832, when forced labour was abolished, it gave employment to 3,751 men and their families: in 1829 the Government paid the Chalias at the rate of 3d. per lb. for peeling the spice, increased in consequence of their complaints to 4d. and 5d. in 1833. An active Chalia, with the assistance of his wife, can peel 100 lbs. in a month, which at 4½d. makes £1 17s. 6d., or £7 for the season of four months, better wages than those obtained by many other classes in the island at that time, and sufficient with their habits, effectually disposing of Miss Martineau's statements in her romance about pearls and cinnamon.¹

A fine gold-coloured volatile oil, similar in taste to oil of cloves, containing steapin or cinnamon camphor and benzoic acid, is obtained by distillation from the leaves and bark, which are first macerated in sea-water for two days. Cinnamon berries, and the young shoots when boiled in hot water, yield a peculiar fatty substance called Colombo wax, of a white colour, which forms on the top of the water when cold, and was made into candles by the Portuguese for burning on the altars of their churches. Di Conti and Knox mention this species of wax, and say it was used by the natives "for aches and pains." Dr. Royle in his "Antiquity of Hindu Medicine," supposes it was the comacum of Theophrastus. Cinnamon roots yield camphor, which is also obtained from the bark of one of the wild species by making an incision in it.

The "*Folia malabarthurum*," an article of commerce obtained from India, mentioned in "*Periplus*," is generally thought to be identical with the *Tamala patra* of the Hindus, or *C. tamala* leaves made into balls, sold at the present day in Indian bazaars.² Some writers have supposed the "*folia*" to be betel leaves, as they are described as resembling vine leaves. "*Periplus*" says, "every year a dwarfish kind of people with

¹ Capper, J. A. S., 1846.

² Rheede, *Hortus Malabaricus*.

broad faces, who are almost wild but harmless, come to the frontier of Thin (probably Bootan), bringing with them goods in baskets that look as if made of green vines, and held a fair. When they were gone, the people of the country collected the leaves from the baskets which were scattered about, and made them into balls which they stitched through with the fibres of the twigs; these balls are of three descriptions and called malabarthurm." (*Vide* ch. x.)

Colonel Yule says, "Garcia Da Orta, 1563, was the first to point out that the malabarthurm was the *Tamala patra*. Linschotten also says, "the leaves called 'folium indium' the Indians call *Tamala patra*; they have a pleasant clove-like smell, and made into balls, being used for preserving clothes from moths." A similar use was assigned to it by Dioscorides and Pliny (xii. 25.) The former says, "some people mistake malabarthurm for the Indian nardi. This substance, once so highly prized in Rome, costing during the Empire 300 denarii per lb., is now little used even in India, except to flavour custards and curries."¹ It does not appear to have ever been made in Ceylon. The berries and flower buds of the aromatic laurels, when dried, have a resemblance to cloves or nails in shape; cassia-berries were formerly exported in large quantities from China, but are not often met with now, and were mistaken for cinnamon berries, which appear to have been very rarely dried in Ceylon.

¹ Cathay, Pref., cxlvi.

CHAPTER XXXIV.

BOTANY.

THE first work ever published on the botany of Ceylon was John Burman's "*Thesaurus Zeylanicus exhibens planta in Insula Zeylana nascentes*," Amsterdam, 1737, founded on the collection of Herman, a Dutch botanist, who returned from India in 1679. This was followed by Linnæus's "*Flora Zeylanica*," in 1749, and Moon's "*Catalogue of Plants growing in Ceylon*," 1824. They are all, however, very incomplete, and it was remarked in 1846 by Dr. Gardner, "that although Ceylon is celebrated for its luxuriant vegetation, the plants which compose it were very little known, no systematic publication having appeared since Linnæus, except Moon's, a work never of much use, and now quite obsolete." To remedy this deficiency Dr. Gardner undertook a new Ceylon Flora, but as he did not live to finish it, it has since been accomplished by Mr. Thwaites, his successor at Peradenia, assisted by Dr. J. D. Hooker, F.R.S., and entitled "*Enumeratio Plantarum Zeylanicæ*," 1864.

Besides the above, several contributions to Ceylon botany have been published in periodicals and other works. Many of the plants which are also native in the Archipelago, are described in the "*Herbarium Amboiensis*" of Rumphius, and others common to India, by Roxburgh and Indian botanists. Dr. Gardner published a short description in the Appendix to Lee's "*Ribeyro*," 1847, and described several plants in the "*Calcutta Journal of Natural History*." Others are figured by Sir W. Hooker in his "*Icones*" and elsewhere, and nearly all the Ferns and *Lycopodiaceæ* in the "*Synopsis Filicum*," 1868, also by Dr. Wight, in his "*Icones Plant. Ind. Orientalis*,"

from specimens collected by Colonel and Mrs. Walker. Dr. W. Amott has likewise described some in his "Pugillus." Many Ceylon fungi are described in the Annals of Nat. Hist. 1842, London Journal of Botany, 1847, Kew Garden Miscellany, 1854, and Linnæan Trans., 1871, and most of the *Orchidaceæ* by Dr. Lindley, from specimens and drawings sent from the island by Mr. Macrae.

There is a magnificent Botanical garden maintained by the government at Peradenia near Kandy, where a matchless display of tropical plants is to be seen. It was originally established in 1799 by Mr. North, at Kalany near Colombo, subsequently removed to Slave Island in 1810, and to Caltura in 1813, where Moon's "Catalogue" was made, and hence to Peradenia.

The number of plants found in Ceylon turns out to be less than was expected from the prolific vegetation. Dr. Gardner estimated that they might extend to 5000 species, but the number of indigenous plants enumerated by Mr. Thwaites amounts to only 2832, viz. :—

<i>Dicotyledones</i>	1959
<i>Monocotyledones</i>	648
<i>Filices</i> , <i>Lycopodiaceæ</i> , and <i>Marsileaceæ</i> . . .	225

However nearly double that of England, and about one-thirtieth of the total number of plants growing in the world, which amount to 92,930. Mr. Thwaites says, "care has been taken in his list not to multiply species unnecessarily, as a considerable amount of variation has been observed. Instances occur in which a more elevated locality produces a form possessing a stouter habit and larger flowers than in the same species growing a little above the level of the sea." The same has been remarked in India, where the *Datura alba* of the hills is three times the size of that in the lower country.

Botanists generally divide the vegetable kingdom into two great families—the PHANEROGAMIC, or flowering plants, and the CRYPTOGAMIC, or non-flowering plants; the flowering plants are again subdivided into two genera: DICOTYLEDONES, or those having two cotyledons or seed lobes, the first leaves in

the rudimentary plant or embryo, such as the oak, elm, and pea; and MONOCOTYLEDONES, or those having only one cotyledon; or if two are present, one is very much smaller, such as palms and grasses. This arrangement was first adopted by John Ray in 1703, and has been followed by De Candolle and most botanists. The CRYPTOGAMIC family include the *Filices* or ferns; *Lycopodiaceæ*, or club mosses, which are leafy plants with the habits of mosses; and the *Marsileaceæ* or *Rhizocarps*, stemless plants usually found in ditches.

In the following account of some of the most useful and remarkable plants of the island much assistance has been derived from Mr. Thwaite's valuable Catalogue.

As Dr. Gardner remarked, "the vegetation of all countries is greatly influenced by physical aspect and climate," quite exemplified in Ceylon. The south-western and southern districts, under the genial influence of the S.W. monsoon, displays a luxuriant and brilliant vegetation of showy tropical plants, lofty trees, and heavy foliage, festooned with charming scandent plants, while fungi of gaudy colours grow round their roots. The plants and climate of this portion of the island and Malabar are very similar; the flora also resembles that of Sumatra and the archipelago.

The north and north-eastern side possesses a very extensive flora, but its general character is marked by a few species which predominate, and are generally identical with those of the Coromandel coast from the drier climate and soil, comprising thorny plants and stunted trees or shrubs on the lower plains, *Acacias*, *Aurantiaceæ*, *Cassia fistula*, *Carissa spinarum*, and many *Euphorbias*, &c. At the foot of the mountains, a great change takes place; the inland north-eastern district being remarkable for the immense forests of fine timber brought down to the coast at Trincomalee and other places, comprising satinwood (*Chloroxylon swietenia*), Ceylon oak (*Schleichia trijuga*), ebony (*Diospyros ebenus*), iron-wood (*Mesua ferrea*), *Bassia longifolia* and *Berrya amomilla*. Most of the plants that grow on the muddy shores and salt lagoons on both sides of the island belong to the order *Rhizophora*, strictly inter-tropical species; some belonging to Australia, and many the

same as found in the Eastern Archipelago, as the *Egiceras fragrans*, *Thespesia populnea*, the tulip-tree of Ceylon; *Dillivaria illicifolius*, and *Paritium tiliaceum*, "bellipatta" of the Sinhalese, which has an extensive geographical range. It is at an elevation of from 2000 to 8000 feet that the greater part of the plants peculiar to Ceylon are to be found, but they generally belong to the same natural orders growing in the Nilgherries, Himalayas, the high lands of Malacca and Java, while a few resemble those of Africa. "Although the Nilgherries have many species in common with similar elevations in Ceylon, a great number found in high altitudes are peculiar to the island: of three species of ranunculus one only is common to both places, the other two being peculiar to Ceylon. Of *Michelia* four or five of the species differ from the single one in the Nilgherries. Ceylon has in general more affinity to the Nilgherries than any other part of the world—yet it has a creation of its own."¹

The difference between plants of the same species growing in Ceylon and the Nilgherries appears to consist chiefly in the larger leaves and flowers, proceeding probably from the milder and moister climate. Dr. Hooker's "Journal in the Himalayas" shows that there is much similarity between the vegetation of Ceylon mountains, the Nepal, and lower Himalayan ranges up to 6000 feet; above this altitude the temperature in the Himalaya is much colder than at Newera Ellia.²

In the warm damp parts of the mountains up to 4000 feet the herbaceous vegetation and underwood are composed of ferns of varied sizes, including gigantic tree ferns, *Alsophila gigantea*, also *Urticaceæ*, *Blumeæ*, and enormous garden balsam (*Impatiens balsamina*). Before the extension of coffee planting in the Gampolo district, a species of gamboge tree, *Xanthochymus ovalifolius*, and the gorgeous *Salmalia malabarica* formed the principal part of whole forests, covering the ground with a carpet of its fallen scarlet petals.

In the highest regions the trees diminish in size, presenting a gnarled and stunted appearance, their branches and stems

¹ Gardner.

² "Kumaon and Turee Ranges," by Capt. Madden, J. A. S. Beng., 1848, p. 375.

being covered with pendulous masses of lichens and mosses and many kinds of orchids; none of the scandent genera of the lower country being found in these elevations. A close undergrowth of nillo (*Acanthacea*) or delicate ferns, and a strong balsamic odour prevails in the jungles about Newera Ellia: here, under the stimulating influence of perpetual spring, annuals from Europe, as the peach and apple, become evergreens, and cease to ripen fruit, whilst many plants are found to remind a European of home—ranunculus, violets, and campanula, rubus and berberry, guelder rose, anemone, alchemilla, agrimony, blue-blossomed gentian, sundew, and in the swamps, carex and juncus.

Exotics.—Numbers of foreign plants are found in Ceylon, and the gardens of Colombo contain so many exotics, the suburbs have been called a botanical garden on a grand scale. There are many well-known European flowers and vegetables—roses, geraniums, sweet pea, the common green pea, radishes, tomato, purslane, Jerusalem artichoke, and cabbage. Most of the European vegetables and flowers thrive admirably at Newera Ellia, particularly potatoes, and some answer tolerably at Colombo and the warmer parts.

Two species of prickly pear (*Opuntia vulgaris*), growing wild on the road-sides about Colombo, are natives of tropical America. A rose-coloured periwinkle (*Vinca rosea*), from Madagascar, has overrun the cinnamon gardens; the climbing *Allamanda cathartica*, with its dark-green leaves and golden blossoms, comes from Guiana; the yellow *Turnera ulmifolia*, from the West Indies; the Cape gooseberry (*Physalis Peruviana*), growing wild at Newera Ellia, came from Peru; the *Mimosa pudica*, a common weed about Kandy, is from South America; also the four o'clock plant (*Mirabilis jalapa*), from Mexico. The agave, the aloe, the yucca, or Adam's needle, *Theobroma cacao* (the chocolate tree), and the ipecacuanha, with its orange blossoms, are natives of South America; the blue-flowered *Nicandra physaloides* comes from Peru; the dwarf prickly poppy (*Argemone*), and the *Helianthus*, or sunflower, are from Mexico. The Guinea grass, which grows in so many gardens about Colombo, and a scarlet ipomea (*I.*

coccinea) are from the West Indies; the tall casuarin, from Madagascar, and the *Latania rubra*, or Bourbon palm, from the Mauritius. Three species of *Xylophylla*, or sea-side laurel, are from Jamaica, and the *Stillingia sebifera*, or tallow-tree, from China.

Although a kind of wild nutmeg grows abundantly in the island and many parts of the East, the true or spicy nutmeg (*Myristica fragrans*) is only native in the Archipelago; but Mr. Anstruther, colonial secretary, about the year 1838 introduced it into Ceylon, where it has succeeded very well, also the clove (*Caryophyllum*). Sir E. Tennent gives this as a "proof of the greater affinity between the flora of Ceylon and the Archipelago than that of India," as the mangostana and the nutmeg have been successfully introduced into the island, while they have failed in India." This is a mistake as far as the latter is concerned. "At the Madras Exhibition of 1855, fine samples of nutmegs were sent by General Cullen from his garden at Velley Mally, near Travancore, likewise from Cochin (Balfour, Cyclop. of India); and nutmegs of good quality are now grown in the West Indies. Cloves, another plant of the Archipelago, long remarkable for its limited natural distribution, have been also successfully cultivated in General Cullen's gardens, which produce some of the finest specimens to be seen anywhere;" and Zanzibar cloves are found in the London market.

The *Ageratum conyzoides* from the West Indies and other foreign plants have extended into the jungles, and become pests to the coffee-planter. Mr. Thwaites remarks, "From the large extent of forest land appropriated to coffee cultivation, there is little doubt that some of the indigenous plants will in time become exceedingly rare, and the obtrusive character of the *Lantana mixta*, a plant brought to the island about forty years ago, is also helping to alter the character of the vegetation up to an elevation of 3000 feet, having apparently found in Ceylon a soil and climate exactly suited to its growth, covering thousands of acres with its dense masses of foliage, taking complete possession of the land where cultivation has been neglected or abandoned, preventing the growth of any

other plant, and even destroying small trees, the tops of which its subscandent stems are able to reach. The fruit of the plant is so acceptable to frugivorous birds that through their instrumentality it is spreading rapidly." The *Lantana* is one of the *Verbenaceæ*, very aromatic plants originally from the West Indies. *Trifolium repens*, or common clover, and chick-weed (*Stellaria media*) are quite naturalized at Newera Ellia.

In the following descriptions the native name will be usually placed first, between commas.

List of Ceylon Vegetable Products known to Commerce, or Exported.

Areca nuts.	Sanders wood, <i>P. santalinus</i> .
Arrowroot, <i>Maranta arundinacea</i> .	Sappan or Brazil wood, <i>Casalpinia</i>
Cardamoms, <i>Elettaria major</i> .	Sappan.
Ceylon moss, <i>Plocaria candia</i> .	†Sugar.
Cinnamon bark.	Tobacco.
†Cloves, <i>Caryophyllium</i> .	
<i>Cocculus Indicus</i> .	OILS.
Cotton.	Earth nut, <i>Arachis hypogæa</i> .
Chay root, <i>Oldenlandia umbellata</i> .	Cocoa-nut, <i>Cocos nucifera</i> .
Coffee.	Castor, <i>Ricinus</i> .
Coir and cocoa nuts.	†Colombo wax or cinnamon steepin.
Ebony, <i>Diospyros ebenum</i> .	Margoza, <i>Azadirachta Indica</i> .
Ginger, <i>Zingiber officinale</i> .	Mee or illipe, <i>Bassia longifolia</i> .
†Gamboge, <i>Hebradendron cambogioides</i> .	Kekuna, <i>Alcumites tribola</i> .
Hemp, <i>Cannabis Indica</i> .	ESSENTIAL OILS.
Myrobalams, <i>Terminalia Bellerica</i> .	<i>Pandanus odoratissimus</i> .
Indian ball, <i>Egle Marmelos</i> .	Cinnamon.
†Nutmegs, <i>Myristica fragrans</i> .	Citronella, <i>Andropogon Martini</i> .
Nux vomica, <i>Strychnos</i> .	Lemon, <i>A. schænanthus</i> .
†Pepper, <i>Piper nigrum</i> .	

Those marked † are doubtful.

Several attempts have been made to cultivate tea in Ceylon, but they have been unsuccessful as a commercial speculation. The plant is said to require a winter, and there is a difficulty in obtaining the skilled labour necessary to prepare the leaves. Cinchona, which has been lately tried, promises to be more successful.¹ The bark is now being produced in the Nilgherries, where the trees thrive well, and should likewise in the mountains of Ceylon, the climate and vegetation being similar. Some of the exports named here are entered in the list doubtfully, as changes take place in the exports of produce from

countries owing to competition among them. Most of the vegetable and wood dyes formerly so valuable—such as brazil and indigo—are being rapidly superseded by coal-tar dyes.

Timber trees.—A list of ninety-six different kinds of timber known to native workmen, with a short description of their uses, was made out some years since by Adrian Mendis, Master Carpenter of the Royal Engineer Department, Colombo, but the number, though great, is exceeded by the woods of India and the Archipelago, where 450 are enumerated. The various European exhibitions of late years have caused many lists to be compiled in hopes they might be used in Europe, but the cost of conveyance must to a great extent stand in the way of this. The nature and properties of many eastern timbers are quite unknown in Europe,¹ and would probably be found for the most part unsuited to the climate, and not worth importing. But to the island their importance is increasing every year, in consequence of the clearing of forests for coffee plantations, and the wanton destruction continually going on, some of the finest woods running a chance of extinction. A law was passed in 1872 to protect the forests in future. Specimens of forty-eight of the best woods of Ceylon were exhibited at the Exhibition of 1851 by the Colonial Department. Those most noted were the paloo (*Mimusops*, India), described as a hard, close-grained, heavy wood, internally of a deep brown colour, with recent layers of a reddish yellow; its compact and even structure indicates that it is admirably adapted for turning: jak (*Artocarpus*), a moderately hard, rather open-grained, heavy wood, of a beautiful saffron-yellow, with a pleasant odour, calamander, and ebony. Several specimens of Ceylon woods will be found in the Kew Garden Museum. Many of the woods of the island are remarkable for their density, twenty species ranging from nearly sixty to seventy pounds the cubic foot; one of the acacias, the cocoa-nut, the two palmyras, and

¹ In 1867 Great Britain imported 12,644 loads of teak, valued at £123,582, from India, and 467 loads of Ceylon timber, valued at £3,724, or £7 19s. 6d. per ton, and 215 loads of dye-woods, value £2,159, or £10 per ton. The total export of Ceylon timber for the same year was £30,833, including £23,482 worth to India.

ebony from seventy to seventy-one pounds, and the iron-wood (*Mesua ferrea*) seventy-two pounds.

The del (*Artocarpus nobilis*, Thw.) is a large tree much used for making canoes, and in house building. The fruit, which is the size of a water-melon, abounds in a tough juice made into bird-lime, and the seeds when roasted are eaten by the natives. This tree, a distinct species, has been confounded with *A. pubescens*, Willd., the angili of Western India.

The jak (*Artocarpus integrifolia*), "kosgass" of the Sinhalese, is one of their most valuable trees, extensively used in making furniture, boats, &c. The wood is yellow when new, but assumes the colour of mahogany with age, and is susceptible of a very high polish. Jak is planted round every hamlet and found in every garden of the lower country, but not wild in the jungle.

The "mcc" (*Bassia longifolia*) gives a valuable wood for building purposes, bridges, and keels of dhoneyes, said to be in no way inferior to teak, and free from the attacks of the teredo. A variety named "paloo" (*Mimusops Indica*) is equally valuable. The "moonemal" (*M. elengi*) is a very ornamental tree with dark green oblong leaves, and fragrant white flowers. The timber is used for making furniture. •

The "hallmillia" (*Berrya amomilla*) is a fine straight tree about forty feet high, with winged seeds, found chiefly in the drier parts of the island, and exported in large quantities from Trincomalee to India, where it is called Trincomalee wood. The Madras masoola boats which pass through the terrible surf of the Coromandel coast are made of it. This wood is highly prized both in India and Ceylon, being light, tough, and pliant, and the best suited in the island for ship-building.

Calamander (*Diospyros quesisita*, Thw.), a variety of the *Ebenaceæ* family, is the most beautiful of all fancy woods, resembling both rosewood and zebra. The colour of the ground is a rich brown of different shades, exquisitely variegated and waved with black. It is very dense and hard, turns well, and polishes like glass. The roots furnish the finest specimens,

¹ Edye, Woods of Ceylon, J. A. R. S.

the ground being paler and the black markings more intense. Several varieties are found in India on the Circar hills and Coromandel coast, where it is called Coromandel wood, from which the term calamander has been traced,¹ though more resembling "kaloo medereya," the Sinhalese name. The true calamander has become scarce in Ceylon, and large pieces very difficult to procure; but a variety *D. oppositifolia*, Thw., of a redder colour, and with more black wavings, is rather common. This appears to have been the wood sent to the Exhibition of 1851.

Next in value to calamander is the well-known ebony (*D. ebenus*), a hard, close-grained wood, as black as a coal, used for making carved furniture. It is only the heart of the tree which is black, the outer parts being quite pale, and used for common purposes. It grows a great size, with large coriaceous leaves of an oval shape. The ripe fruit is eaten by the natives, but is very astringent, also the bark. Many varieties of the Ebenaceæ family are found in the island, used for building and other purposes. "Kaloo-kadombaereya" (*D. oocarpa*, Thw.) furnishes a variegated timber curiously veined, and specimens from the heart of the tree are occasionally met with of great beauty. The juice of the "timberu" (*D. embryopteris*)² is used for rubbing over fishing canoes, cordage, lines, and nets, which hardens and preserves them, producing a brownish colour similar to tanning. The fruit is about two inches in diameter, of a green colour, and full of a very astringent juice, containing sixty per cent. of pure tannic acid, used in India as an excellent remedy for diarrhœa.³

Ebony is obtained from the Archipelago, Coromandel coast, Mauritius, and Madagascar, but that of Ceylon is said to be superior to all of them. Large quantities of the various species are imported into Europe, and it appears to have been known from the earliest times, being mentioned by Ezekiel (ch. xxvii. 15), where the men of Dedan are described as bringing to Tyre ivory and ebony. Herodotus (iii. 95) mentions ebony as part of the presents given to the King of Persia by the people

¹ Tennent.

² Also *D. glutinosa*.

³ Balfour, Cyclo. Beng. Pharm., p. 290.

of Ethiopia; and Dioscorides speaks of two kinds—one Ethiopian, which was considered the best, and the other from India, variegated with pale stripes; but it is said no species of *Diospyros* have as yet been discovered by botanists in Upper Egypt or Abyssinia, hence the ancients must have obtained their ebony either from India, Ceylon, or Madagascar, and it has been seen there are many trees of this family growing in these places furnishing both black and variegated ebony, although commentators have doubted whether there was more than one kind.

One or two species of sweet-scented *Calophyllum*, called “domba” by the natives, furnish in abundance a soft, open-grained, light wood, bearing a resemblance to inferior Honduras mahogany. It has a pretty curled pattern, and takes a good polish. These are very tall trees, common in the lower central parts of the island; the snow-white flowers, which grow in clusters, are very fragrant, and the green fruit contains a quantity of pleasant fixed oil of a dark green colour, called “keena tel,” good for skin diseases. The seeds of some other varieties¹ also contain a quantity of oil used in burning. *Calophyllum* are common in the Archipelago, and found all over India, where they are called calaba trees, and a yellow resin which resembles myrrh, named tacamahaca, obtained from the roots.

“Booroota” or satin-wood (*Chloroxylon swietenia*) is found in the greatest abundance in the eastern province, where it forms the common building timber, growing a large size in Ceylon, although a small tree in India. It is a beautiful glossy yellow, exceedingly hard and fine-grained wood, with an agreeable odour, and contains an essential oil. Some specimens are flowered or wavy in the grain, and highly prized, being very rare, and considered by some next to calamander.

“Na-gass” or iron-wood (*Mesua ferrea*) has been named after the Arabian physician and botanist Meuse, who lived in the eighth century. Sir W. Jones says truly, “it is one of the most beautiful trees on earth,” with a deep evergreen foliage and rich fragrant blossoms of ivory-white petals, and orange-

¹ Wight's Icones. *Calophyllum* is called Alexandrian laurel in England.

coloured stamens ; the leaves are lanceolate, and when young of a scarlet colour. It is a 'great favourite with the Buddhists, who say the next Buddha will obtain "nirvana" under its shade, and is commonly found planted near their temples. The dried blossoms called "nagkesur" in Sanskrit, are sold in every bazaar in India, being highly esteemed for their fragrance and medicinal properties. The arrows of Kamadeva, the Hindu Cupid, are tipped with them, which is alluded to by Moore in the lines—

" And those sweet flowrets that unfold
 Their buds on Kamadeva's quiver,
 Anemones and seas of gold,
 And new-blown lilies of the river."

The "nadoong" (*Dalbergia lanceolaria*), found in the lower southern province, yields very good open-grained heavy wood, well adapted for furniture. *D. latifolia* furnishes the "sessu," a black wood, one of the most valuable of Western India, mentioned in "Periplus."

The "sooreya" (*Thespesia populnea*) furnishes a hard open-grained heavy wood of a deep chestnut colour, admirable for carriages, gun-stocks, and blocks. This is the tulip tree of the Europeans, agreeably shading the streets of Colombo and other seaports, being fond of the saline air. Linnæus very appropriately named it *Hibiscus populneus*, as it has the leaves of the poplar and flower of the hibiscus ; its large tulip-shaped blossoms have a dark red centre. The tulip tree is only found within the tropics, where two or three varieties exist. "It is doubtful if it is a native of Ceylon, although a few are found near Batticaloa apparently wild."¹

The well-known teak (*Tectona grandis*) is said not to be a native of Ceylon, but introduced by the Dutch, who planted it in several parts of the island. It is a straight and lofty tree, with panicles of showy white flowers and very large leaves from twelve to twenty inches long, the shape of an elephant's ear. The wood, of a light brown colour, is remarkably dense, strong, and durable, and, when fresh, has an agreeable odour something like a rose. It contains an ash-coloured opaque oil,

¹ Thwaites.

sold in Indian bazaars as a varnish for woodwork. Teak is a native of the mountains of Malabar, the banks of the Godavery, Burmah and Pegu, which contains vast forests of great importance to England as a maritime nation.

"Koang" or Ceylon oak (*Schleichia trijuga*) is common in the eastern parts of the island. The natives obtain an oil for burning from the acorns, and a quantity of lac is often found on the young branches.

The "seyembala" or tamarind, is a lofty tree with a straight trunk, small crooked branches and acacia-like leaves, which throw a very deep shade, supposed to be cooler than that from any other tree, but considered dangerous to sleep under in India, as they give out a damp acid. The wood is heavy, close grained, and hard, some specimens are beautifully veined, and considered one of the finest woods of Southern India. The well-known fruit, much used in medicine for making cooling drinks, is a long deep brown pod, full of a fibrous pulp and seeds like a bean, largely exported from India in casks between layers of sugar. The natives of Ceylon and India use them as a condiment in curries, and for preserving fish, hence called tamarind fish. The leaves, which are nearly as tart as the fruit, are also used in curries, and as a decoction for wounds. The Europeans first became acquainted with the fruit through the Arabs, who call it "tamar hinde," hence, no doubt, the Latin name.¹ Mr. Thwaites considers that it is probably not truly indigenous in Ceylon.

Fruits.—Very few of the native fruits are eaten by the Europeans, being for the most part sour or disagreeable; the finest fruits in the island are not indigenous, having been introduced by the Portuguese and Dutch. The mangosteen (*Garcenia mangostana*), the most delicious and prince of fruits, is a native of Sumatra and the spice islands; it is round, about the size of an orange, with a brownish shell something like that of a pomegranate, but much softer and thicker, divided internally like an orange, having the flavour of a grape and strawberry,

The papaw (*Carica papaya*) is supposed to have been intro-

¹ Royle.

duced from America. Linschoten says, "it came from beyond the Philippines to Malacca, and from hence to India" (p. 97). A tall tree with a hollow stem, topped with a head of leaves having very long stalks, underneath which hang a number of fleshy fruit about the size of a small water melon, being very similar in appearance and flavour, full of a milky juice and flat seeds.

The "jambu" or Malay apple (*Eugenia malaccensis*) is a native of Malacca; this fruit is nearly white, having a waxy appearance, very soft and woolly in texture, with the flavour and perfume of rose leaves, and commonly called the rose apple, but the real rose apple (*Eugenia jambos*) is a much smaller fruit, resembling an apricot, about the size of a hen's egg, and a native of Java; the tree, which is similar to a peach, is rather rare in Ceylon, and the natives take some pains to preserve the fruit, when ripening, from the attacks of squirrels, by enclosing them in two halves of cocoa-nut shells tied together, the stalk passing through a nick in the side of the shell.

The "lo-quât" (*Eriobotrya japonica*) from Japan, is a small round fruit resembling a diminutive apple, the colour of an apricot, with an agreeable acid flavour.

Shaddocks are abundant and resemble a huge lemon; some have a red pulp. This fruit appears to be the result of cultivation, as it is not to be found anywhere wild.

The "lovi-lovi" is from Amboyna, and is like a large cherry, but acid; it makes very good jelly, similar to red currants.

The "rata-mora" or litchi, also called the rambutan and nephelium (*Dimocarpus litchi*), is a celebrated Chinese fruit, growing in clusters on a stalk, and about the size of a walnut, of a reddish brown colour with a thick hairy skin; when it is removed the fruit inside presents a yellow-white transparent appearance, and of an indescribable acid flavour. There is a stone in the centre. A wild variety of *Nephelium* called "mora gass," growing in the central province, produces a small crimson fruit eaten by the natives, and the nuts of the "penella," (*Sapendus emarginatus*), are extensively used in Ceylon and India for

washing clothes in place of soap. The fleshy part of the berry is viscid and semitransparent, and when mixed with water forms a frothy lather like soap. The bark and roots also possess the same property in a lesser degree.

The belimbi (*Carambola*) a Malayan fruit, grows pendent on the trunk of the tree below a few leaves. In form and substance it is not unlike a small yellow cucumber, but angular, having eight sides, and full of an acid juice made into jellies and tarts.

The small red mulberry (*Morus indica*), a native of Southern India, is a delightful fruit, rather rare in Ceylon.

The "amba" or mango (*Mangifera indica*), is a large and spreading tree like a walnut, bearing an oval-shaped fruit of a fine green colour with a thin smooth skin, and an orange-coloured pulp surrounding a large stone like that of a peach. Mangos are a fine fruit, but very variable in quality, being often full of tough fibres with a taste of turpentine, instead of a delicious soft pulp. Those grown at Jaffna are the best in Ceylon. Mangos are very abundant among the lower jungles in a wild state.

The "custard apple" (*Anona muricata*) and the sour sop (*Anona squamosa*), both resemble artichokes in appearance and colour externally, but larger and flatter, with a thick and strong rind, enclosing a quantity of creamy pulp like a custard, eaten with a spoon, very sweet and luscious, with a slight taste of rose; the flowers of the *Anona* are very fragrant, and the leaves very obnoxious to insects, they come from the West Indies.

Pomegranates, which are abundant, were introduced by the Portuguese. The "guava" (*Psidium*) is about the size of a hen's egg, of a yellow colour, with a red-coloured seedy pulp, having a sweet aromatic flavour something like a strawberry.

The oranges of Ceylon are remarkable for retaining their green colour when perfectly ripe; they are very full of juice, of excellent flavour, and have a very smooth and thin skin. There are also several varieties of mandarin oranges, some exceeding small, others very large; the fruit are loose within the rind.

The cashew nut (*Anacardium occidentale*) is a sort of freak of nature in the vegetable world, for while all other kernels grow inside the pulp and are covered by it, this grows outside, the fruit and nut being distinct, yet joined together at the end. The fruit is like an Eve-apple, of a yellow colour, with an unpleasant astringent taste. A spirit can be distilled from the juice when fermented, and is manufactured in the West Indies. The Dutch consider it superior to brandy as a "liqueur." The nut is a grey brown, enclosing a kernel the size and shape of a large kidney bean, tasting when roasted like a chestnut. The shell contains a very caustic poisonous oil, which stains the hands, and can be used for marking linen. The Sinhalese have been long aware that the oil of the cashew-nut is poisonous, which was proved by a case that occurred in the criminal courts of England about the year 1860; on this account the nut requires to be roasted before it is eaten. The tree is of medium height, and yields a quantity of gum resembling gum arabic. Paludanus, in his notes to Linschoten, says it was brought from Brazil to India (p. 94).

The pine apple, one of the most abundant and cheapest fruits in the island, according to Linschoten was brought to India by the Portuguese from Brazil, where it was called ananafa or anas (p. 90).

The commonest of the native fruits is the "kos or gedera" (*Artocarpus integrifolia*), and perhaps the largest fruit in the world, often weighing more than 40 lbs., two of them suspended at the end of a pingo being a usual load for a man to carry, and natives thus laden are frequently seen about Colombo. It grows pendent from the trunk of the tree, often near the roots, first appearing in the form of an ament or catkin, developing into an oval fruit with a coarse granular skin of a green colour, yellow inside, full of soft fibres and kernels and a tenacious white juice. It has a very coarse flavour and odour, disagreeable to Europeans, who rarely eat it, but a great favourite with the natives, who also eat the kernels after they are roasted.

Pliny has accurately described this tree, "putting forth fruit from its bark, a single one being enough for four persons."

Arbori nomen palæ arienæ, fructum cortice mittit . . . ut uno quaternos satiet (xii. 12). His name for it is probably derived from the Tamil pila. The mediæval travellers call it chaqui and baraki. The English term jak appears to be a corruption of "jaca," an Indian name. A variety of the jak (*A. lakoscha*) produces a small round fruit, a species of bread fruit (*A. incisa*). When cut in slices and fried in butter, it tastes something like a half-raw potato. If the famous fruit of the South Sea Islands is not a great deal better, it does not deserve half the praises bestowed on it.

The plantain or banana (*Musa paradisia*) is one of the wonders of tropical vegetation, from the rapidity of its growth, and prolificness. There are many varieties found in native gardens both in Ceylon and India, which all appear to be derived from the wild species *Musa sapientum*, the fruit of which is not eatable, found about rocky places in the central provinces,¹ and in the forests at Chittagong. The stem of the plantain is not in the least woody, being composed of the same substance as the succulent leaves, containing an enormous quantity of water and a good deal of useful fibre, which might be more used than it is. A variety *M. textiles* found in the Philippines, produces the well-known manilla hemp. The fruit, which hangs in one immense bunch, often weighing 50 lbs., is rather insipid, but wholesome and nutritious, containing 40 per cent. of a farinaceous substance called plantain meal, composed of 86 per cent. of starch and sugar, and 5 of protein compounds. It has been calculated that an acre of plantains would yield one ton of meal. In India the fruit is sliced and dried in the sun as a sweetmeat. :

The avocado pear (*Persea gratissima*), the shape of a ordinary pear, green outside and yellow inside, comes from the West Indies; also the granadillo (*Passiflora edulis*), a purple or flesh-coloured water-melon.

Grapes of good quality are grown at Jaffna. Sir E. Tennent (i. 89) implies that the culture of grapes in Ceylon was unsuccessful, in consequence of the want of a winter, until Mr. Dyke in 1840 made an artificial one by removing the earth from

the roots ; but grapes, said to have come from Jaffna, were sold at Colombo in 1888. Many varieties of climbing plants resembling the grape vine, with very acrid leaves and bunches of uneatable fruit, some very small and nearly black, others pale red and the size of cherries, are found in the jungles of the lower part of the island; among them is the *Vitis indica*, also very common in the Deccan and other parts of India. Dr. Hooker¹ says, "the origin of the common vine being unknown, it becomes a curious question to decide whether the Himalayan *Vitis indica* is the wild state of that plant, an hypothesis strengthened by the fact of Bacchus having come from the East."

Water plants.—The pools and tanks of Ceylon, in common with other tropical countries, are covered by superb pink and white water-lilies or lotus, whose broad green leaves float on the surface. They belong to two families, the *Nymphæa* and *Nelumbium*. The *Nymphæa lotus* is the least common in the lower parts of the island, usually with white flowers, large cordate leaves, and a many-seeded fruit enclosed in a capsule. There are also two other varieties of *Nymphæa*, *N. stellata*, with stellate petals of a very pale blue colour, and *N. rubra*, a small red species found about Jaffna.

The *Nymphæa* possesses bitter, astringent, and some say narcotic properties. The roots contain a quantity of starch, used for food in India, as well as the seeds after being roasted. This appears to be the "Lotus Ægyptica" described by Herodotus (lib. ii. 92, iv. 177), "growing above the waters of the Nile, the seeds of the flowers resembling those of the poppy, which the Egyptians made into a kind of bread, and also ate the root of the plant." According to modern travellers, the lotus has long disappeared from the waters of the Nile.

The *Nelumbium speciosum*, found about Colombo and elsewhere, is a magnificent water-plant, with large attractive flowers, generally pink or rose colour, though some are white and yellow, diffusing a delightful fragrance, especially in the morning, when they rise with the sun above the surface of the water, under which they retire at night. They have only one

¹ Himalaya Jour., ii. 187 ; see also Royle.

seed—a nut resembling an olive or acorn—tasting like an almond, and containing a quantity of farinaceous substance. Arrowroot prepared from them was shown in the Exhibition of 1851. The nuts are highly prized and eaten in Ceylon, India, China, and Japan: both roots and stalks also form articles of diet in India. The *Nelumbium* has been called the water-bean, the sacred bean, the Pythagorean bean, and the Egyptian bean, the *kuamos*, or red lotus of the ancients, whose fruit was compared by Theophrastus to a wasp's nest, and represented on the Egyptian monuments, also described by Herodotus as the rose lily of the Nile, with fruit the size of an olive-stone, eaten by the Egyptians both green and dried. Theophrastus further identifies it by mentioning the circumstance of the flower retiring under water at night and rising with the sun.

The lotus has been dedicated by the Buddhists to Sakya: the famous tooth at Kandy is placed on a golden lotus. It is also the most sacred of flowers among the Hindus, and a popular emblem of beauty, constantly alluded to in their poems and romances. The red lotus is fabled to have been dyed by the blood of Siva, when he was wounded by the arrow of "Kamadeva," and is depicted on all the brass vessels used in their temples.¹ Commentators have had some difficulty in identifying the various plants referred to by classical authors under the name of lotus. Fee, in his "*Flore de Virgil*," enumerates eleven plants to which the term has been applied. The word used by Herodotus has a double signification, meaning also sea-onion, and some think it was the lotus, which the Israelites were repining after in the desert, rendered leeks in the English version; others have thought that the lotus of the Nile was the fabulous food of the *Lotophagi*, "of so delicious a description, that when strangers had once tasted it they no longer wished to return to their native country." The *Lotophagi* of Africa are described by Herodotus as eating a fruit similar to the date, and also made into wine. Mr. Lindley says, the lote bush (*Zizyphus lotus*), which gave its name to the *Lotophagi*, is to this day collected for food by the

¹ Wilson, "Hindu Theatre."

Arabs of Barbary.¹ There are many varieties in different parts of the world used as food.¹ (*Vide* ch. xxxv.) Dioscorides and Pliny describe a lotus supposed to be a variety of the ebony, producing a fruit which caused oblivion.

Many species of *Utricularia*, or bladder worts, are common on the waters of paddy-fields and tanks in warm parts of the island, charming little plants with radiate leaves, and yellow, blue, or white flowers, both large and small; a bladder, or inflated appendage, attached to their roots enables them to float about on the surface of the water during a certain period, after which the bladder bursts and they fall to the bottom, where they again take root. The *Pinguicula*, one of the European bladder-worts, is said to give consistence to milk in Sweden, and is a common marsh plant in England. Another equally curious and pretty aquatic plant, the "gass-nidi-koomba" (*Neptunia oleracea*), very common on shallow water and borders of tanks, has highly sensitive leaves, which close at the touch like the *Mimosa*, and floats on the water by means of a light spongy substance forming part of it, only taking root when the water dries up. It is also known by the name of *Desmanthus natans*, and found in India.

Cyperaceæ, or sedges, usually growing in moist places in tufts, are sometimes enlarged at the roots into bulbs and tubers. Some varieties grow on dry sand, as the *Carex arenaria* of sand dunes. Mr. Thwaites enumerates nearly eighty varieties growing all over the island, from the sands of Batticaloa to the elevated plains of Newera Ellia and Horton, on the banks of rivers, in paddy fields, and swampy places. The tropical species are generally very different from those of northern countries. The tubers of some are eaten in India. "Kallan dooros" (*C. rotundus*), a variety abundant in cultivated land, has very aromatic tubers, used medicinally by the Sinhalese, and for making hair washes by Hindu ladies. The tubers are about the size of pigeon's eggs.

Trapa bispinosa, a floating aquatic plant found in the tanks, forms an important article of diet in Kashmir, being obtained from their lakes, and said to have yielded a revenue

¹ "Vegetable Kingdom," p. 356.

of 12,000*l.* per annum to Runjet Singh.¹ The fruit is called the Singara nut in India. *T. bispinosa*, as its name implies, is distinguished by two projecting spines. *Trapa* are found in Siberia and Cochin China. The Chinese variety, *T. bicornis*, resembles the head of a bullock with the horns turned downwards. *T. natans*, the European species, is called the *marron d'eau* by the French, and is mentioned by Pliny as forming the food of the ancient Thracians.

Orchidaceæ are epiphytal plants, usually growing upon trees, clinging by their long succulent roots to the naked branches, deriving their nourishment from the humid atmosphere of deep shady forests where the hot vapours cannot ascend. In these situations the number of orchids is extraordinary, abounding in the southern jungles about Adam's Peak. Tropical orchids are mostly of the species which grow on trees, but many are found in Ceylon among grass. In the southern parts they are often attached to the trunks of coconut trees in gardens with pieces of matting, diffusing an exquisite fragrance; among them is said to be the variety which yields the vanilla of the perfumers. Everywhere the flowers of orchids assume the most grotesque and eccentric forms, having little likeness to any part of the vegetable kingdom, bearing more resemblance to animals. One called the "Spirito Santo" by the natives of Panama (*Peristeria elata*), resembling a dove alighting on a flower, has its counterpart in the "Sudu parajeya mal" of the Sinhalese (*Liparis atropurpurea*).² The *Disperis tripetaloides*, a very curious species found near Rambodde, is not unlike the head of an owl, having pink flowers with a yellow lip. *Satyrium nepalense* has some resemblance to a child's doll. "*Oberonia Scyllæ* is a most remarkable looking thing, with minute crimson flowers like a bunch of red tongues thrust from a mask resembling a gorgon."³ Perhaps the most beautiful of Ceylon orchids is the "wanna raja" (*Anæctochilus setaceus*), very common in marshy places about Negumbo; it has a delicate white flower on a pink stalk, with cordate leaves resembling black velvet, marked with gold

¹ Royle.

² Wight's *Icones*, *Dendrobium cruminatum*, Moon.

³ Lindley, p. 499.

on the upper surface like a butterfly's wing, the under part being a pale lake colour. A variety named "eeru raja" (*Monochilus regius*) has two white stripes on the leaves. *Cælogyne odoratissimus*, found at Newera Ellia and the Nilgherries on trees, has very fragrant pure white flowers, growing in dense tufts about six inches high.

- *Fungi and Lichens*.—These are very abundant in Ceylon. It is said few of the fungi can be identified with those described by Dr. Hooker in the Himalaya. Some of the genus *Agaricus* are very singular and beautiful, being clothed in brilliant colours—scarlet and yellow; one is allied to a Jersey species (*Valvaria*). Edible mushrooms are numerous—as *Agaricus deliciosus*, *A. campestris*, and *A. Georgii* with white foldets, found on the plains of Hambantota. One hundred and ninety-nine species of lichens with orange, yellow, and blue colours, growing on trees in the higher regions up to 8000ft., have been enumerated.

Plants of the North.—A few baobab trees (*Adansonia digitata*) are found about Manaar, supposed to have been brought there from Africa at some remote period. They are also found at Tutocorin, Guzerat, and other parts of Western India. Baobabs are among the largest trees in the world, those at Manaar measuring upwards of thirty feet in circumference, though not quite so high; a shapeless mass of useless wood with few branches or leaves, and are probably a thousand years old, if we are to judge from the observations of the traveller Adanson, who was enabled to ascertain with certainty that a baobab in the Cape de Verde Islands increased about one foot in diameter during a year.¹

The *Salvadora Persica*, a good-sized tree discovered near the sea coast by Dr. Gardner, is interesting on account of its having been shown by Dr. Royle in his "Antiquity of Hindu Medicine" to be the mustard tree of scripture, the chardul of the Talmud and kharzal of the Arabs. It has bright green leaves and small reddish seeds, with an aromatic odour and pungent taste, similar to garden cress. The seeds are said to be used in Arabia and other eastern countries as a substitute

¹ De Candolle; Lindley, Veg. Kingd., p. 204.

for mustard, and the acrid bark in India by native doctors, for blistering. It grows near Jerusalem, and obviously answers the description of the tree mentioned in Mark (ch. iv. 81), much more than the mustard plant.

Many varieties of *Aurantiaceæ*, to which belong the lemon, shaddock, citron, and orange, are found, chiefly in the dry parts of the island. They all possess very fragrant properties, with white flowers. The fruit of most of them in the wild state are not much larger than a pea. *Limonia pentaphylla* produces a very small crimson-coloured fruit. Some varieties are scandent, as the *Limonia scandens*, others are armed with large thorns. The leaves of "karapinchu" (*Bergera kœnigii*) are used as a seasoning for curries in Ceylon and India, and form part of the ingredients of "chutnies." The leaves are also considered a remedy for dysentery in India.¹ The *Ægle Marmelos* produces a fruit resembling a large orange, with a similar perfume, variously called the Bengal quince, bel fruit, and Indian bael; it is eaten by the natives, and has long been in high repute as a remedy for dysentery and diarrhoea. The medical properties are strongest in the half-ripe fruit; a fragrant liquor called marmata-water is extracted from the flowers. It also yields an oil and a gum resembling arabic. A variety is called the "diwool gass" (*Feronia elephantum*).

Acacias.—These beautiful trees present many varieties, chiefly found in the dry sandy districts of the north; most of them are also natives of the Coromandel. Some of the acacia barks possess astringent and tonic properties, and are becoming valuable for tanning purposes. Several yield useful gums, and the larger trees fine and durable timber. The "rat-kihiri" (*A. catechu*) is used in India for making a kind of terra Japonica by boiling chips of the wood in water. An infusion of the same is much esteemed by the Sinhalese as a purifier of the blood, and drinking cups are often made of it.¹ *A. arabica* yields a gum resembling that of the *A. vera*, or true gum arabic, and the bark is used medicinally. *A. latro-num* is a straggling shrub, armed with formidable spikes two or three inches long, of a white colour, growing in pairs at

¹ Royle. Thwaites.

each joint. They are called buffalo thorns from their resemblance to the horns of a bullock.

Melia Azadirachta, found near Trincomalee, has been called the Persian lilac, and the flowers of many *Meliaceæ* resemble the lilac. The "kohomba" or margoso (*Azadirachta indica*) is a medium-sized tree found in the driest part of the island. A bitter fixed oil (largely exported) is extracted from the nuts, the size and shape of an olive, which grow in clusters, and a gum with an odour of garlic exudes from the bark. The juice and leaves are used by the Sinhalese as a cattle medicine. Every part of the tree, especially the bark, is very bitter and astringent, and much employed by Indian doctors as a tonic and febrifuge. Dr. Wight of Bombay considered it equal to cinchona. The bark and roots of the "bin kohomba" (*Munronia pumila*, Thw.), another tree of the same family found in the south, are much valued by the Sinhalese as a medicine.

Plants of the shores.—The "cadol" or mangrove (*Rhizophora*) is a striking feature in the tropical landscape wherever there is a shallow and muddy shore, especially near the mouths of rivers, forming a dense jungle, a favourite resort of crocodiles and mosquitoes. The most curious part of the mangrove is the aerial germination of its seeds, which do not drop from the parent stem until they have assumed the form of embryo trees, and their roots ready to fix in the mud. The mangrove also spreads itself over the swamp after the manner of the banyan, throwing out roots from the stem at some distance above the mud, and arching downwards, fix in it; these again send out fresh roots spreading round the tree in all directions, an example of the wonderful provision of nature to the peculiar circumstances of position, for without all these roots it could not stand up in the loose mud and sand it loves to grow in. There are many varieties of mangrove in India, the Archipelago, and Ceylon; the most common in the island is the leafy mangrove (*R. mucronata*), the bark is considered better than oak for tanning. *R. gymnorhiza*, found on the southern coast, covers the delta of the Ganges, producing a hard and durable yellow-coloured wood called fire-wood mangrove

by the Malays, which burns with a vivid light and sulphurous smell.¹ A valuable chocolate-coloured dye made from the common or black mangrove (*R. Mangle*), was introduced by Dr. Bancroft; the bark is also used in tanning and as a febrifuge.²

Another very remarkable tree of the sea shores are the screw pines (*Pandanaeæ*); they also have a number of aerial arching roots to enable them to hold up in the loose soil where they grow, and were named by Linnæus, from the Malay pandang, meaning conspicuous, having long, rigid, sword-shaped leaves, resembling those of a pine-apple, arranged in a spiral manner round the trunk, which is surmounted by a mass of amber-coloured uneatable fruit the shape of a pine cone. The leaves contain a quantity of tough and glossy white fibres. The "moodo kaeyeya" (*Pandanus odoratissimus*) is named from the exquisite perfume of its yellow flowers which yield the "attar of keora," much esteemed in all Asiatic countries, and constantly referred to by the Sanskrit writers under the name of ketaka. The Arabs call it kazee and Avicenna armak. Oil impregnated with the attar is valued as a medical stimulant in India,³ and the natives of Ceylon used the aerial roots medicinally.⁴

The "gin pol" or water cocoa-nut (*Nipa fruticans*), common in the mangrove swamps of the south, is a low stemless plant with pale green feathery leaves and large clusters of small nuts having the appearance of a dwarf palm, but classed by botanists with the screw pines. It is also a native of India and the Archipelago, usually flourishing in brackish water alongside of the mangrove, and abounds in saccharine sap resembling palm toddy, which is extracted as an article of diet in Burmah. This plant is interesting to geologists on account of the nuts of a similar species having been found in the tertiary formations of the island of Sheppy at the mouth of the Thames.⁵ Mr. Thwaites mentions only one variety in Ceylon, but they are numerous in India.

¹ Mason.

² Royle. Simmonds.

⁴ Thwaites.

³ Royle, p. 35, 'Fib. Plants.'

⁵ Himal. Jour., p. 1.

The *Cycadaceæ*, small palm-like trees or shrubs, very numerous in the delta of the Ganges, Australia, Japan, and Burmah, have only one representative in Ceylon—*Cycas circinalis*, “maddoo” of the natives, who make cakes from the seeds, which they use medicinally. All the Cycades contain a mucilaginous juice full of starch, made an article of diet in some Eastern countries.

Along the marshy banks of rivers near the coast about Negumbo and other southern places, there are many “gedde killala” (*Sonneratia acida*), large handsome trees with thick leaves and solitary flowers, producing an acid, globular fruit. The roots spread out to a great distance, throwing up curious spindle-shaped excrescences several feet above the surface, having a corky substance easily pierced with a pin, hence called the cork tree by Europeans.¹ It abounds in the Tenasserim mangrove swamps as far as the tidal waters reach, and is said to be a better substitute for coal in steamers than any other kind of wood.²

The *Acanthus ilicifolius*, a handsome shrub like holly, with dark flowers, is common near the sea; also near Galle the *Hernandia sonoria*, very tall trees, having the seed enclosed in a large inflated calyx with an aperture in it through which the wind whistles in a peculiar manner. The kernel is oily and purgative, also the bark and young leaves, and the juice a powerful depilatory.

Some species of *Barringtonia* are found near the mouths of rivers and warm humid situations on the southern sea shore, and inland up to an elevation of 1500 feet; very handsome trees, with dark green shining leaves and large showy flowers, with an immense number of stamens growing in a circular manner, producing a large and angular seed with a hard skin. “Deya midella” (*B. speciosa*) has white petals edged with crimson, and “ella midella” (*B. acutangulum*) long pendulous racemes of scarlet flowers; the seeds are used by Indian doctors. *Barringtonia* are quite a tropical family of plants.

The “neyangalla” or *Gloriosa superba*, a species of lily, is a very curious and splendid creeping plant remarkable for its

¹ Rumphius, Dr. Templeton, J. Ent. Soc., iii. 302.

² Mason.

magnificent flame-coloured, drooping flowers, the petals, stamens, and style turn and grow upwards, like a flower turned inside out, while the leaves prolong their extremities into tendrils. It is fond of the sea shore and is also common in thick jungles of the interior, and in the Tenasserim provinces and Malabar, but is rather rare in other parts of India. The bulbous roots are supposed in Ceylon to be poisonous.

Two very fragrant shrubs with white flowers are not uncommon on the sea shore about Galle and Caltura. The "nil pitcha" (*Guetarda speciosa*) has large flowers always in bloom, which are dedicated by the Hindus to Seva and Vishnu. The *Ægiceras fragrans* has a profusion of small flowers blooming periodically, and is a great favourite with fire-flies.

Some varieties of salt worts which yield soda and barilla when burnt are common on the sands of Jaffna and the southern coasts, as the *Salicornia brachiata* and *Salsola indica*, a small weed with linear-shaped leaves, much eaten by Hindus who live near the sea, and considered very wholesome.¹

The "moodo-gatta colla" (*Hydrophylax maritima*) is a straggling herbaceous plant with succulent leaves and stalks, and pale lilac blossoms, very common on the Galle face, Colombo and other sandy places, also in the Coromandel; spreading over the surface it strikes out roots at every joint and binds the sand together, along with a species of sword bean, and a variety of the old genus *Dolichos*, called "wal awara" (*Canavalia obtusifolia*), having pretty fragrant blossoms, the young pods are used as a vegetable in India. Under the general term of *Dolichos*, Linnæus included a number of twining tropical leguminous plants, some of which are edible like the kidney beans of Europe, since divided by botanists into several families. *D. florus* is similar to the black gram of the Coromandel coast, eaten by the Hindus. The *Canavalia gladiatus*, or sword bean, is only found in the north; they have large showy flowers, and in India, where they are cultivated, the pods attain a length of two feet.

Several species of *Phaseolus*, the scarlet runners and kidney beans of Europe, are common both in India and Ceylon, where

¹ Roxburgh.

they are called "wal-maa." The roots of some are supposed to be narcotic and poisonous. The three-lobed kidney bean is very common.

The *Guazuma tomentosa*, a tree found about Jaffna, is probably not indigenous, being a native of South America, and was introduced into India about seventy years since, where it is known as gun-stock wood. A fibrous substance found between the bark and wood, containing a quantity of mucilage, is used in clearing sugar. It is allied to the chocolate-tree, and has a tuberculated fruit the size of a cherry. Another of the same family, found at Badulla, closely resembles *Kydia calycina*, Roxb.¹

The "saayana," or chay root (*Oldenlandia umbellata*) is very abundant near the sea, particularly about Manaar, and is also a native of the Coromandel, Java, and Mexico. The root, which is long and of an orange colour, furnishes an excellent red dye for cotton, similar to munjeet, or Indian madder (*Rubia munjeet*), used to a great extent in Southern India for dyeing the celebrated red turbans of Madura. This dye deserves a better reputation in Europe than it possesses, being, according to the report of the jury of the Exhibition of 1851, nearly equal to madder. Dr. Bancroft, who made his experiments with a sample of damaged roots, had previously given a discouraging account of it. However, there appears to be some difficulty in transporting it to Europe, as it deteriorates rapidly in the hold of a ship, or in any dark place.²

During the time of the Dutch it was largely exported from the island, and still figures among the exports. The chay is a low-growing biennial plant, with numerous small white leaves, having a bitter and unpleasant taste, used medicinally for diseases of the chest. Wild chay root yields, it is said, one third more colour than the cultivated.

Some curious gramineous plants are found on the sands, such as the *Spinifex squarrosus*, whose seeds are contained in a circular head some inches in diameter, composed of spines which radiate from a centre, by which means it rolls over the

¹ Thwaites.

² Bancroft on Colours, p. 282.

soil, disseminating its seeds.¹ *Panicum squarrosum* has a peculiar shaped seed.

The *Aristolochia*, a family of small half herbaceous, half climbing plants, with cordate leaves, also found in India, are remarkable for their bitter and medicinal properties, used for snake bites and diarrhœa.

Several species of Tamarisks are found in marshy places of the western coast, small glabrous shrubs, with numerous branches and pink or white flowers. Tamarisks are common in India and other warm parts of the world, growing on the shores of the Mediterranean.

The “at nairenchee,” or prickly-fruited pedaliu, *P. murex*, is a large succulent plant, with small yellow flowers, very common near the sea. The fresh leaves when agitated in water have the strange property of rendering it mucilaginous without altering the colour, taste, or smell of the liquid. When water in a basin is thickened in this way, it can be taken out in a mass like jelly, but becomes liquid again in a few hours. It is used in Ceylon and India for fraudulently thickening milk, and has medicinal properties well known in the peninsula, where it is called “caca mullen.” The property of turning water into a clear jelly is also found in the young leaves of the *Sterculia urens*, which contain a quantity of mucilage, and Linnæus has described the effect produced on milk by *Pinguicula*. The “tolabo” (*Crinum Asiaticum*), a species of *Amaryllidaceæ*, with narrow succulent leaves, two or three feet long, and a bulbous root, very abundant on the sea coast, is used as a fence for the native gardens, and the bulbs of a variety called “walloono,” *C. Zeylanica*, are used medicinally.²

Plants of the highest hills.—Two or three species of *ranunculus* (*R. sagittifolius* and *R. Wallichianus*), are found in the swamps about Newera Ellia, the Horton plains, and other elevated places. The *ranunculus* family, named after rana, a frog, from their inhabiting the same places, are all characteristic of a cold, damp climate. When found within the tropics, they are usually seen in high mountain regions. One of the Ceylon varieties

¹ Tennent.

² Thwaites.

grows in the Nilgherries, and nearly one hundred are natives of the Himalayas.

As an exception to this rule, a very pretty species, with a yellow flower, termed *Naravelia zeylanica*, after the native name, is found in the warm parts of the island, and also in southern Tenasserim.

The *ranunculus* family, to which belong the buttercups of England, are all more or less poisonous, some exceedingly so, as the hellebore and aconite. The celebrated Indian poison, "Bish or Bikh," is made from the root of *Aconitum ferox*.

An anemone, *A. rivularis*, with white flowers, found at Newera Ellia, is also a native of northern India, and a clematis (*C. Gouriana*), a climbing perennial, common in the Ghauts and Deccan. *C. smilacifolia*, with purple flowers, is found about Ambagamowa. Many of the clematis are handsome scandents found in all parts of the world.

Several species of *Michelia*, a variety of *Magnolia*, are found in the upper central province. Magnolias are numerous in China, large and beautiful trees, with showy fragrant blossoms and glossy leaves.

Campanula fulgens, a very erect plant, having a hairy stem about a foot high, covered with pretty serrated drooping flowers, is occasionally met with, "but are very common in the Nilgherries after rain in shady places."¹ *Campanula*, or bell worts, are rare in tropical regions. One or two are found in the Himalaya, and some curious species are natives of the Canaries.² *Wahlenbergia agrestis*, a kind of campanula, with a blue flower, is abundant in elevated grassy places; also found in similar localities in the Nilgherries.

Two very tall lobelias (*L. aromatica* and *L. excelsa*),³ both having a pyramid six feet high of pale yellow flowers, tinged with lilac, and very long pointed leaves, are found at Newera Ellia and the Nilgherries. A variety (*L. trigona*), with serrated leaves, blue flowers, and a triangular stem, is found all over the island. These plants, called "ros nee" by the natives, belong to an extensive order containing many

¹ Wight's Icones.

² Lindley.

³ Wight's Icones, No. 1170.

varieties of considerable beauty, all more or less poisonous, though some are used medicinally. *L. longiflora*, of the West Indies, is very fatal to horses who eat it.

The "mah-rat-mal" (*R. arboreum*), the finest of the rhododendrons, is the only variety in Ceylon, where it attains the dimensions of a large tree. There is a forest of them on the Tottapella mountains, growing from fifty to seventy feet high, with stems three feet in diameter. Rhododendron flowers and honey are said to be narcotic and dangerous in some places. Dr. Hooker attributes this property to the honey of Nepal, and the poisonous symptoms described by Xenophon, "when men fell stupefied in all directions, covering the ground with their bodies as if a battle had occurred," have been attributed by some to the *R. ponticum*, and by others to the *Azalea pontica*. The flowers of *R. arboreum* are said to be eaten by the hill tribes of India, and no poisonous properties are supposed to exist in those of Ceylon.

Gaultheria are represented by the "kappooroo" (*G. fragrantissima*), an ornamental shrub with red flowers and blue berries, found in the highest parts of the central province; also in Nepal. *Gaultheria* are natives of the Andes and Japan.

Vaccinium Leschenaulti, an abundant Nilgherry arboraceous plant, producing acid berries the size of red currants, and tasting like cranberries, is found at Newera Ellia. Dr. Hooker mentions *Vaccinium* in the Himalayas at an elevation of 4000 feet. The different species of whortleberry, bilberry, and cranberry belong to this family. The "welambella" (*Embelia*, Linn.) is a diffuse shrub, remarkable for the venation of the leaves, when dry, forming a network of white lines.¹

Three species of *Ilex*, allied to the holly, grow in the highest elevations. One of this family (*I. Paraguensis*) yields the beverage called mate, or Paraguay tea. Thunberg found a variety in Japan. Some *Ilex* barks have tanning properties.

Many species of *Symplocææ*, arboraceous plants, with white flowers resembling those of a blackberry, are found in the

¹ *E. ribes*, Burman.

higher elevations. They nearly all possess an astringent property in the leaves, and some are employed for dyeing red and yellow in India and Thibet. The "bambu" (*S. spicata*), which grows in the lower parts of the island, has a hard pitcher-shaped berry.

A very beautiful species of Jessamine (*J. humile*), with acacia-shaped leaves and fragrant yellow flowers, a native of the Nilgherries, is found on the elephant plains, and a very pretty species of *Ceropegia* (*C. Gardneri*) grows about Rambodde. This is a curious genus of creeping plant, the flower forming a narrow neck, budging out again at both ends. The colours are various, many varieties being found in the island.

There are several varieties of *Melastomaceæ*, very beautiful herbaceous plants or shrubs, which produce dark coloured edible berries that stain or dye. Some are epiphytal plants, festooning the trees of the higher regions. *Osbeckia* have many representatives and are very numerous about Adam's Peak. Varieties are found with purple, yellow, and other coloured flowers. *Pachycentria* are a scandent family found by Dr. Gardner about Rambodde and Adam's Peak. *P. Walkeri* Thw., climbs the stems and branches of trees like ivy, "covering them in May and June with large rose-coloured blossoms, being one of the most lovely plants in the island."¹ *Medinella fuchsoides* Gard., found on trees at Newera Ellia, has petals half white, half crimson, and a deep purple berry. *M. maculata* is a half scandent branchy shrub, about two feet high, with small rose-coloured flowers and a globular berry. *Memecylon* are quite a tropical species, closely resembling *Myrtaceæ*, presenting many varieties having blue flowers and berries, not altogether confined to the mountains. The leaves of *M. edule*, also found on the Coromandel coast, form a very astringent dye.

In the higher regions are found some species of *Christisonia* of Gardner, a variety of *Orobanchaceæ*, an order of parasitical leafless plants, growing up along with others on whom they live, to which belong the broomworts of Europe. It is said

¹ Thwaites, "Medinella Walk," Gardner, Calcutta, J. Nat. Hist., viii. 11.

the seeds of some will lie inert in the earth for an indefinite period when not in the vicinity of those they attach themselves to.¹ *C. grandiflora* is a large blossomed variety found on the roots of *Acanthaceæ*. Nothing can exceed the beauty of its rose-coloured flowers growing in clusters. They are very numerous between Ratnapura and Adam's Peak. *C. tricolor*, as its name implies, has charmingly variegated flowers of red, pale pink, and bright yellow. *C. bicolor* is brick-red and yellow, and *C. unicolor* all yellow.

Balanphora indica is another curious leafless parasite, growing on the stems of trees, and producing woody knots. No use is made of them in Ceylon, but Dr. Hooker mentions that in the Sikkim Himalaya and Thibet the knots of *Balanphoraceæ* are turned in a lathe and formed into little drinking cups, highly valued by the inhabitants, who suppose them to be antidotes to poison. Dr. Hooker gave a guinea for one (p. 47).

Photenia notoniana is a kind of hawthorn, or an allied plant resembling *P. integrifolia* of Lindley. *P. glabra*, a variety found in China, has red berries. *Photenia* have been found in Rangoon, and Dr. Hooker mentions one in Nepal, (*P. dubia*,) used in dyeing scarlet. They are a subtribe of *Rosaceæ*, to which belong apples and quinces.

Several species of brambles and wild raspberries are found about Newera Ellia, Adam's Peak, and high altitudes. *Rugosus* are also known at Mahabaleshwar in the Malabar hills, and a yellow-fruited bramble in the Himalayas. Dr. Gardner says there are several beautiful and distinct species of *Rubus* in the mountains, quite different from those in the Nilgherries. One produces a large black fruit six inches in diameter.² *Rubus lasiocarpus* grows both on the hills and southern coast; also in Mysore.

Pimpinella Leschenaulti, with white flowers, growing on the Horton plains, is a variety of the *anise* of the druggists. Among other European plants found in the mountains is a species of leek or chive (*Allium Hookeri*, Thw.),* two species

¹ Lindley.

² Calcutta J. Nat. Hist., viii.

of juncus or rushes in swampy places, *Viburnum*, allied to the guelder rose; (*V. opulus*,) one of the teasles; (*Dipsacus Walkeri*,) *Valeriana Hardwickii*, and two varieties of primrose, *Lysimachia ramosa* and *L. japonica*. Primroses are very rare in the tropics, and only found in the mountains. *L. Leschenaulti*, a red-blossomed variety, grows in the Nilgherries. *Arvensis cœrulea*, a blue-flowered anagallis, with serrated edges, grows in the Uva district and Nilgherry corn fields. The Indian plant is much more luxuriant than the European. The anagallis is poisonous. Orfila destroyed a dog with three drachms of extract. *Linum mysorensis*, a variety of flax, with pale orange flowers,¹ is abundant at Badulla. *L. usitatissimum*, or common flax, is a native of India.

Two varieties of *Gordonia* Ellis, large trees forty or fifty feet high, with coriaceous leaves and reddish purple flowers, are found in the forests of the higher central province. They belong to the same family as the tea plant and camellias of Japan.

Balsamineæ are found in the greatest profusion in damp, shady jungles, where the temperature is not very high. Mr. Thwaites enumerates twenty-two varieties, chiefly with purple, red, or scarlet flowers, a few having white and red. They are all remarkable for great size, and the elastic force of the seed capsules, which burst when ripe with the least touch, hence they have been called "noli me tangeri."

Some of the tropical Aralias, to which family belong the ivies of Europe, are large trees, as the *Hedera exalta*, Thw. Others are scandents, as the *H. emarginata* of Moon, having white flowers tinged with red, and the "Itta," (*H. vahlii*, Thw.,) very abundant up to an elevation of 3000 feet, the only species found in the lower country. It yields a resin having a smell of turpentine. Most of the Aralias contain resin. Chinese ginseng comes from one, and are all supposed to be poisonous, but Dr. Hooker describes the inhabitants of the Sikkim mountains as cutting the leaves of various species of these plants for their cattle. He was also struck by the resemblance

¹ Thwaites.

between the pith of some and the celebrated rice paper of the Chinese, and came to the conclusion that it was made from them, an opinion afterwards confirmed by the receipt of the plants from China, now named *A. papyrifera*.¹

¹ Jour., p. 336.

CHAPTER XXXV.

BOTANY.

THE plants described in this chapter belong mostly to the lower regions, extending some distance up the mountains.

URTICACEÆ.—Some tropical members of the genus *Urtica*, or nettle, attain a gigantic size, being fifteen feet high, and contain very useful fibres: China grass cloth is made from those of *Boehmeria nivea*. Many varieties of *Urtica* are found in the damp forests, including three species of *Boehmeria*, “maha deya dool” of the Sinhalese, who make fish-lines from them, also from *Urtica longifolia*. The “kahambiliya” (*U. pterophylla*, Moon) was also found in the Nepal by Dr. Hooker at an elevation of 8000 feet along with other species, made into cords and cloth by the inhabitants (ii. 148—173). The common stinging-nettle of Europe (*U. stimulans*) is likewise found in Ceylon.

Artocarpaceæ.—Nearly all the trees of this family, to which belong the edible fig and Indian-rubber (*Ficus elastica*), yield a milky juice more or less adhesive and elastic when consolidated, always acrid and often poisonous. This property, however, generally disappears from their fruits when ripe.

The “ritta grass” (*Antiaris innoxia*, Thw.) is a gigantic and remarkable variety, called the sack tree in India (*A. saccidoria*), from the circumstance of sacks being made from the bark, which are used for carrying rice and other purposes both in Ceylon and India. They are made by cutting off a piece of branch or trunk the desired circumference and soaking it well in water. It is then beaten with clubs until the bark separates from the wood, leaving a part untouched at one end, the separated bark is then turned down and the wood sawn off, leaving

a slice which forms the bottom. The "ritta gass" was mistaken by Dr. Gardner (who discovered it at Kurnagalla in 1840) for the celebrated Upas tree¹ of Java (*Antiaris toxicaria*), which does not grow in Ceylon, but is of the same family. The Upas has been rendered notorious in consequence of the strange statements concerning it made about the year 1780 by Foerch, a surgeon of the Dutch East India Company, who stated, "so deadly were the emanations from it that out of seven hundred criminals sent to collect the poison scarcely two out of twenty returned, and that for fifteen or eighteen miles round the tree no living animal of any kind had ever been discovered." Dr. Horsfield and Leschenault have shown that this account is quite fabulous; the poison has been brought to Europe and analyzed, and found to be less active than that of the cobra. It is a bitter yellow fluid flowing from incisions made in the bark, and similar in its properties to strychnine.

The "maha nooga" or banyan tree (*Ficus indica*) has been called the "Thug" of the vegetable world, from their strangling as they grow old the trees that sustain them in their infancy. Their manner of development is very curious and singular, making their appearance in the form of a slender shoot hanging down from a moist angle among the branches or a hollow in the bark of some other tree, where the seeds carried by birds have been dropped and sprouted; the shoot on reaching the ground takes root there, and throws out fresh shoots, the whole growing into a cylindrical trunk round the supporting tree, eventually destroying it. (*Vide* ch. xxxii.)

None of the banyans in Ceylon are to be compared to those of India, such as the famous Nerbudda tree, which is said to have three thousand aerial roots, and to be capable of sheltering as many men. The banyan produces a reddish fruit resembling the edible fig. Also the "Bo gaha" of the Sinhalese, "Pei-to" of the Chinese, and "Bodhi" of the Sanskrit (*Ficus religiosa*), an object of great veneration among Buddhists (*vide* ch. vii.), and has some resemblance to the

¹ A very elaborate account of the Upas is given by Mr. Bennett in Horsfield's "Planta Javanica Rariores," p. 52.

aspen-leaved poplar. The leaves have wavy edges and long slender stalks, and being agitated by the least breath of air are usually in motion, "according to the natives in honour of Buddha." It is said that the Syrian Christians account for a similar trembling movement in the leaves of the aspen from the circumstance of the "Cross" having been made from the wood of this tree. The bo and most of the tropical fig family germinate like the banyan on other trees or old buildings, their numerous roots winding through the crevices till they reach the earth, eventually forming a trunk; but it is not the true stem, as that grows upwards from the place of germination. The roots of the *Ficus elastica* are very curious, looking like a mass of writhing snakes. Some fine specimens are found in the island, but are thought not to be indigenous.

The "nettol" (*Ficus parasitica*, Thw.)¹ has a resemblance to the ivy creeping over rocks and old buildings.

The "gooranda" (*Celtis dysadoxylon*) has been named from the very offensive odour which proceeds from the wood when it is cut. *C. orientale* is a variety also found on the Garrow hills, India, where clothing is made from the bark.

PEPERACEÆ are scandent plants possessing pungent properties, owing to an acrid principle called piperin. "Gammeris," or common black pepper (*Piper nigrum*), is much cultivated in the island, being usually trained over the stems of jak and areca trees; the berries are gathered before they are ripe, and dried in the sun on mats. The best black pepper is grown on the Malabar coast, which has been noted for this product from the earliest times. *P. sylvestre* is a wild variety found in the lower jungles: the well-known cubeb is a species only native in Java. "Bulet walla" (*Charica siriboa*), and "rata boolat walla" (*C. betel*), are two varieties of the piper betel, as it is commonly called, extensively cultivated in Ceylon, India, and other Eastern countries, for the sake of the leaves, which are used as a masticatory. The plant is trained over a trellis like a vine, producing leaves fit for use when a year old, and lasts for a long time; the flowers are yellow and the leaves dark and glossy, having a hot and acrid taste,

¹ *F. repens*, Moon; Thwaites; Royle, Essay on Hindu Med., p. 85.

slightly narcotic (*vide* ch. xix.). The betel is said to be only native in Pegu, a closely allied plant is found wild in Ceylon.

ZINGERBERACEÆ.—“Ingoroo,” or common ginger (*Z. officinale*), is cultivated in the lower country for the sake of the roots, and several varieties of curcumera are found in native gardens. The “kaha” (*C. longa*) has a yellow root called turmeric, much used in curries, and the tubers of *C. angustifolia* furnish a quantity of starch resembling arrowroot eaten in India. Some varieties of *Elettaria* grow wild in the jungles, others are cultivated, as the “ensal” (*E. cardamomum*), also called *E. zeylanica*, which produces the Ceylon cardamom, an article of export much used in medicine. Cardamoms were known to Dioscorides, and are of two kinds, the round seeds, which are larger than those called true cardamoms, which are oval, and supposed to be produced from quite different plants; but Mr. Thwaites says they are only varieties of the same. The roots of *Kæmpferia galanga* are very aromatic and used medicinally by the natives, also worn as necklaces in India. *Costus speciosus* has also roots that were formerly in great repute among druggists, and highly esteemed in the East. There are one or two varieties of *Amomum*, but the true grains of paradise, or Guinea pepper (*Amomum melegueta*) do not come from the East, as often supposed, but from Africa, and are used for adulterating beer.

MARANTACEÆ (*Maranta arundinaceæ*) is extensively cultivated; the root yields the true arrowroot of commerce.

EUPHORBIACEÆ.—This is a very extensive order of succulent stemmed plants, abounding in acrid, purgative and often poisonous juice. A great many varieties are found in the island, chiefly in the hottest and driest parts, where some attain the dimensions of large trees; many *Euphorbiaceæ* resemble cactus.

The milky juice of the “wawa handu” (*E. tirucalli*) which grows near the sea, is used medicinally by the Malabars. The “dalook” (*E. antiquorum*) is also a native of the barren sands of Arabia; the branches are angular, and the juice a violent purgative, if not poisonous. *Jatropha manihet* has a large tuberous root containing a quantity of starch, which forms the

"cassava bread" of South America; it also contains hydrocyanic acid, a volatile poisonous essence, extracted by reducing the root to a pulp, and spreading it on a hot iron plate. Its cultivation is much neglected in Ceylon.

The "endare" or castor-oil plant (*Ricinus communis*), also called Palma Christi, grows abundantly about Colombo. It is a good sized shrub with a green bark, plane-shaped leaves, and a hairy capsule. The oil is extracted from the seeds when cold, and also by boiling, and forms an article of export. There are two or three species, one having broad leaves. "Naga welle" (*Croton tiglium*) is not found in a wild state, being cultivated in native gardens. A small tree, producing seeds the size of a hazel-nut, from which croton oil is extracted, the most powerful of all purgatives, and considered by the Sinhalese to be very poisonous; it is also classed in European Pharmacy as a poison; the seeds are more virulent than the oil. There are many varieties of the Croton tribe in Ceylon, one of which, *C. laccifera*, furnishes a gum lac called "kappetya," used in painting and medicine by the natives. (*Vide* ch. xxii.)

A large tree, called the "nilli gass" (*Phyllanthus emblica*), has a sour fruit resembling a gooseberry, eaten by the natives. In India the flowers are considered cooling and aperient, and the astringent bark used in tanning. The *Aleurites tribola* is much cultivated for the sake of the oil called "kekuna," obtained from the nuts. It is not indigenous, being a native of the Moluccas.

RHAMNACEÆ.—The shrubs named *Zizyphus* produce a small acid edible berry, one of them being the lote bush, from which the ancient Lotophagi are supposed to have derived their name. The "erramina" (*Z. ænoplia*) is very common in the lower jungles, also in India, where a decoction of the bark is used for healing wounds. *Z. jujuba* is found about Anuradhapura; the bark is said to be used in the Moluccas for diarrhoea, and the berries of *Z. xylopyrus*, a thorny tree, for dyeing leather in India. *Z. lucida* has small reddish berries, and *Rhamnus Arnottianus*, found about Newera Ellia, a dark purple berry.

TEREBINTACEÆ.—Some of this family yield a clammy caustic juice, which turns black, and inflames the skin, the most

powerful being that of the *Semecarpus anacardium*, or marking nut tree of India, used for blisters, removing warts, and marking linen and cotton cloths. Many other varieties of *Semecarpus*, called "badula" by the natives, are found in the island, chiefly medium sized trees with crimson berries. The "kaakooka" (*Canarium zeylanicum*) yields a quantity of resinous balsam, which the natives mix with paddy chaff, and burn near their domiciles, as they say the smoke drives away snakes.¹

DIOSCOREACEÆ are chiefly twining plants which furnish the tropical tubers called yams. Some of the species are poisonous. Six varieties are found wild, the tuberous roots of all except one (*D. bulbifera*) being eaten by the natives; none of even the cultivated species are at all palatable to most tastes. The tubers of *D. alata*, the West Indian yam, attain a great size, weighing many pounds. The "katto wella," or wild yam (*D. pentaphylla*) is very abundant, and also grows in Southern India. The tubers of *D. bulbifera* are broken in pieces and thrown into water to attract fish.

ARACEÆ.—Some of this order are poisonous and others edible, chiefly tuberous rooted plants of which the common arum of Europe is an example. The "kettulla" (*Lagenandra toricaria*) is considered exceedingly poisonous in India. *L. lancifolia*, found on the banks of streams in the southern province, is called "atta oodiyang" by the natives, who use the roots medicinally; they also employ the bulbs of the "panoo alla" (*Arum trilobatum*) to kill maggots in the sores of cattle.

Dr. Hooker mentions "that the inhabitants of the Himalayan valleys eat the starch of arum roots after they have been pounded and fermented, which destroys the poisonous and acrid principle" found more or less in all the Araceæ, causing a burning sensation in the mouth. He found them growing 11,000 feet above the sea; none grow in Ceylon at a higher elevation than 6000 feet.

The "kidaran" (*Amorphophallus campanulatus*) when cultivated produces edible roots eaten by the natives; in its wild state they are used medicinally. It is also cultivated in India, where the roots are considered very nutritious, and sold for a

¹ Thwaites.

rupee per maund.¹ Several varieties of *Colocasia*, both wild and cultivated, are eaten by the natives, as the "kandalla" (*Arum colocasia*), very abundant on the banks of streams and other damp places. It also forms an article of diet in Egypt, Polynesia, India, and Zanzibar.

Among the allied family of *Orontiaceæ* are several climbing genera with aerial roots, found on trees in the central province, such as the "pota wel" (*Pothos scandens*), producing seeds or berries which are eaten by the natives after being well boiled, and are employed in India as a remedy in putrid fevers. Another sub-genus, the "wada kaha" or sweet flag (*Acorus calamus*) produces the *Calamus aromaticus* of the drug-shops; the whole plant is aromatic, but the roots are the best. The Sinhalese, who use the leaves and roots medicinally, cultivate the plant in their gardens.

LILIACEÆ form an order of bulbous-rooted plants, such as the tulip and agave. Three species of wild asparagus, "hata-wareyā" of the Sinhalese, are used by them medicinally. The "neyanda" (*Sansevieria zeylanica*) resembles the agave, having smooth oblong leaves, which yield a very silky and strong fibre of excellent quality; also abundant on the Coromandel coast, where it is much used. Three species of *Smilax*, varieties of the true sarsaparilla of South America, are found in the central province.

GRAMINACEÆ.—Nearly 200 species of grasses are found in the island, including divers edible grains, and several species of bamboos.

The "oona gass" or common branching bamboo (*Bambusa Thouarsii*) grows chiefly in the lower central and southern provinces, and is much used by the natives for temporary buildings and other purposes, but they do not turn it to so many ingenious devices as the Chinese. Bamboos, from their peculiar tubular structure, are amazingly strong; two pieces ten feet long and three inches in diameter will bear a weight of 1500 pounds. "Kattoo oona" or thorny bamboo (*B. spinosa*) is common on the banks of rivers and streams, growing in dense clusters or tufts, from twenty to thirty feet high, and has rather

¹ Jaffrey and Mason, Useful Plants.

long narrow leaves, covered with rough asperities; the seeds are eaten by the natives and used as a substitute for rice in India, where a silicious substance called tabasheer is found in the joints.

A common kind of reedy grass called "illook" (*Imperata arundinacea*) is used for thatching. The *Saccharum spontaneum* is the thatch-grass of India; both are allied to the sugar-cane.

The "goyang" or common rice (*Oryza sativa*) grows wild in wet places; many varieties are cultivated in the island, also "mainairee," or common millet (*Panicum miliaceum*). The "ammo," a kind of millet (*Paspalum scorbiculatum*), is very abundant, and there are many varieties of panicum grasses, some of which are cultivated as fodder for horses and cattle. *P. myurus* is almost similar to the exotic guinea grass. "Koorakan" (*Eleusine indica*) is extensively cultivated as an article of diet, producing a grain like clover seed, and an intoxicating drink called boja is made from it in India by moistening the seed and allowing it to ferment for two days, and then pouring boiling water on it.

Several varieties of *Poa*, the hay-grass of England, are found in most parts of the island, and many species of *Andropogon*, chiefly in the upper provinces, growing on the open patenas. Some of them contain a quantity of volatile oil having a strong odour of lemon, as the "maana" (*Andropogon Martini*) known in India as the russa grass of Nemur, and yields the citronella oil of commerce, which Dr. Royle identifies with the spikenard of the Bible and Theophrastus. Lemon oil is obtained from *A. schananthus*, cultivated in the neighbourhood of Galle, but is not indigenous; 991,292 ounces, valued at £9080, were exported from Ceylon in 1866-7. The fragrant roots called petiver or vitiver, sold in perfumers' shops, are those of *A. muricata*, found in the lower country, and the leaves of lemon grasses are used in Ceylon and India as a medicinal tea, being very bitter and aromatic.

MALVACEÆ.—The most common of this order are the *Hibisceæ*, presenting many varieties distinguished by showy flowers, chiefly shrubs, although some are large trees, often found on the borders of tanks and marshy places. Many of them

have a very tough bark, and abound in mucilage. The bark of *H. furcatus*, a small shrub, yields a white flaxen-like fibre. The “abelmoschatus” (*H. moschatus*) is not uncommon in the south, and a variety is found at Newera Ellia. The name is derived from the Arabs, who call it “hab-ul mooskh” on account of its musk-scented flowers, and are said to add the seeds to their coffee. The fibres of the “belli patta” (*Paritium tiliaceum*) are used by the natives for making rough ropes, and the mucilage for food in India in times of scarcity. A variety of the cotton plant of commerce (*Gossypium*) is found in gardens about Colombo, and is also cultivated both for home use and export.

The *Hibiscus rosa chinensis* is a very pretty shrub, common in the gardens about Colombo, and was introduced from China; it has large crimson flowers shaped like a convolvulus, and called the shoe flower by the Europeans, from their producing a polish on shoes like blacking. The juice of the flower is full of mucilage, and turns a deep purple or black colour, used by the Chinese for dyeing their eyebrows, but is not a permanent dye. The plant is common in India, where the leaves are used as an aperient.¹ The *Pavona odorata*, found in open places, is remarkable for the delightful fragrance of its white or pale red flowers—one of the five perfumes in which the Hindu Cupid dips his arrows.

DILLENIACEÆ.—Most of this order are tropical, large and handsome trees remarkable for the magnificence of their flowers, eight or nine inches in diameter. Some are found near banks of rivers and in damp forests. They have usually yellow flowers, but some are white, as *D. retusa*, and their foliage is covered with hard asperities. The leaves of *D. sarmentosa*, “korasawel” of the Sinhalese, are used by them in place of sand paper for polishing wood. The “hondapara” (*D. speciosa*) is a beautiful tree with white and yellow flowers, having an agreeable acid taste, much used by the Hindus in curries and chutnies; they also make a sort of jelly of the fruit, which contains a quantity of mucilage, but is said to cause diarrhœa.

ANONACEÆ are a tropical order of plants distinguished by a

¹ Ainslie, Mat. Med. 198.

powerful aromatic taste and perfume. The leaves of *Artabotrys aromaticus*, found in the north, are regarded in Java as invaluable for colic, also the roots of the *Polyalthia*, but the latter is considered a dangerous remedy. A variety of this species (*P. Mooni*) with red flowers, is found at Caltura. *Uearia macrophylla*, Thw., produces fruit in grape-like clusters, black outside and red inside, eaten by the natives. The "kappooroo" (*Gonithalmus Walkerii*) has red flowers and fragrant roots containing camphor, which are chewed by the natives, also the bark and ochre-coloured flowers of the "nattoo" (*Xylopia parriflora*) along with their betel.¹

MAGNOLIACEÆ.—The "sapu," or champac (*Michelia champaca*), is the only variety found in the lower country. Mr. Thwaites says, "although common in cultivated grounds, he has not yet found it truly wild in the jungles." They are usually planted near Viharas, and are very handsome trees, remarkable for the perfume of their saffron-coloured flowers, highly esteemed by the Buddhists, and constantly strewn in their temples, yellow being their sacred colour. The fruit, which grows in clusters like grapes, is also yellow and eaten by the natives. The champac is not uncommon in India, and dedicated to Krishna, and is one of the five flowers in whose perfume the Hindu Cupid dips his arrows. Sir W. Jones says, "bees finding the flowers too aromatic do not seek their honey." In India an aromatic oil is made from them, and the powder of the bark is medicinal. The flowers of the Nilgherry champac are nearly white.

MYRISTICACEÆ.—The spicy nutmeg is not indigenous in Ceylon, but there are several wild varieties, usually lofty trees, found in damp localities or on the banks of rivers, in the central province. Their barks contain an astringent juice which stains red, and the fragrant male flowers are used by the natives for perfuming their clothes.

MENISPERMADS are an order of curious tropical climbing plants, some possessing active narcotic and poisonous properties, while others are medicinal. An infusion of the wood of the "weni wel" (*Coccineum fenestratum*) is used by the natives as

a bitter tonic; also an infusion of the young shoots of the "rassa kinda" (*Tinospora cordifolia*) for fevers. It is known in India as the gulancha of Bengal, a celebrated febrifuge, much employed in the peninsula, as well as the wood and bark of *Menispermum glabrum*. The "rassa kinda" is very common in lower jungles, climbing over the trees, and possesses an extraordinary vitality. If a portion of stem several yards in length be cut off and coiled round the branch of a tree it will send down shoots, like a banyan, till they reach the ground, where they take root.

The most poisonous of the Menispermads is the "titti wel," or *Cocculus Indicus* (*Anamirta cocculus*), a strong scandent with a corky bark deeply cracked, and round shining leaves; it produces seeds like a large allspice, having a white kernel with a bitter taste, but devoid of smell, and contains a peculiar acid called picrotoxic. The Sinhalese steep rice in a decoction of the seeds with which they stupefy fish and birds, but they are dangerous to eat when caught in this manner, as the drug is very powerful. It makes a very effective wash and ointment for killing insects in sheep, much used in Australia. *Cocculus* is also a native of Malabar and the eastern islands, and an important article of commerce, 240 tons being annually imported into England, used, it is said, for adulterating beer.

The "Colombo root" of commerce, called "kalamba" by the natives, and "Raz de Columba" by the Portuguese, is not a produce of Ceylon, as its name implies, but comes principally from the eastern coast of Africa, being the roots of the *Cocculus palmatus*; some is said to come from Malabar in small pieces of a grey colour, having a wrinkled appearance and exceedingly bitter. Thunberg was the first to point out its real source (iv. 185).

* STERCULIACEÆ.—Some remarkable members of this tropical order are found in the lower country. The "telimboo" (*Sterculia foetida*) has received from the Europeans the well deserved name of "stink tree," in consequence of the odour of putrid carcasses that proceeds from its dull crimson flowers. The fruit is very curious, being a leather-like case the shape of a ham, of a fine crimson colour, containing a number of black seeds arranged in a circular manner inside; they are.

roasted and eaten by the natives. both in 'Ceylon and India. *S. guttata* is also a native of Malabar, where the white fibres of the bark are made into a kind of cloth.

The "katto imbool" (*Salmalia malabarica*) is a very gorgeous and tall tree, often a hundred feet high, having horizontal branches, and a light green bark armed with thorns. They are covered with scarlet tulip-shaped blossoms, producing long pods filled with black shining seeds embedded in a silky cotton, much prized for stuffing pillows and cushions, but said to be unwholesome, and it cannot be spun from want of adhesion. The "imbool" (*Eriodendron orientale*) is a variety closely resembling the *Salmalia*, but has no thorns; it is also a native of the peninsula, and has yellow flowers. They are sometimes called cotton trees and bombax.

The "kattoo bodde" (*Cullenia excelsa*) of Wight's Icones (*Durio zeylanica*, Gard.)¹ is a variety of the famous *Durio zebethinus* of the Archipelago, an exceedingly tall tree, growing 120 feet high, with a straight stem, having only a few branches near the top. The fruit, which grows on the trunk, has been compared to a rolled-up hedgehog, about the size of a melon, of a yellow colour, and covered with spines. The Ceylon durian differs in several particulars from that of the Archipelago, the fruit being uneatable, and has not the same horrible odour, which, according to Rumphius and Valentyn, is so intolerable people were forbidden by the Dutch to bring it into a town, yet it is much relished even by Europeans, who become accustomed to it. Crawford calls it "a fascinating fruit, the natives proceeding long distances through the jungles in order to eat it."

LOGANICEÆ are remarkable for their venom, as the dogbane of Europe; some are trees and others large scandents. The celebrated *Strychnos nux vomica*, "goda kadoo" of the Sinhalese, is a tree of moderate size, producing a deep yellow fruit resembling an orange, with a brittle skin full of pulp, and a number of seeds which contain the poison called strychnine or *nux vomica*. The seeds are round and flat, with a hard horny skin of a transparent grey colour, woolly internally,

¹ Calcutta Jour., viii. 3; vide ch. xii.

and having a very bitter taste but no smell, and yield a resin soluble in alcohol; all parts of the tree are intensely bitter except the flowers, and the wood and bark are called by druggists false angustura bark; the seeds are considered in India an antidote to snake bites. *Nux vomica* acts on the spinal marrow, and is one of the most powerful of poisons, both on man and animals.¹

It is remarkable that the "ingini" (*Strychnos potatorum*), a variety closely allied to the *nux vomica*, should not only be quite harmless but useful, the seeds being sold in Indian bazaars for clearing water by rubbing them round the inside of the vessels, when the impurities in the water fall to the bottom, and travellers in the jungles, where the water is bad, take them with them for this purpose. The *S. potatorum* is a densely-leaved tree, and the fruit round, shining and black, containing only one seed. Dr. Hooker attributes its action in clearing water to astringency.

Two climbing varieties of the *Strychnos* contain strychnine, *S. columbrina* and *S. minor*; the former, also a native of the Philippines and Cochin China, is known as "St. Ignatius's bean," and has an orange-like fruit; decoctions of the roots and other parts are used by the natives in fevers and snake bites, but are of little value, and an overdose will kill a patient. The wood is one of the numerous sorts called Pao de cobra by the Portuguese.

FABACEÆ are found all over the island, including the thorny acacias of the north and the magnificent asokas of the south, their distinguishing features being papilionaceous flowers not found in any other order, and a leguminous fruit or lengthened pod containing seeds.

Crotalaria.—Of this sub-genus there are many varieties, several producing fibres, the most valuable being the "hanna" (*C. juncia*), made into ropes and fishing lines. This is the sun hemp of India, largely cultivated in the Madras Presidency for making gunny bags; the fibres when properly prepared, being considered equal to the best Russian hemp.²

Indigofera.—The true indigo plant (*S. tinctoria*), is a native

¹ Orfila, ii. 330.

² Royle, Fib. Plants.

of Ceylon, as well as many allied plants found chiefly in the north. The "alloo nilla" (*Tephrosia tinctoria*) is called Ceylon indigo or anil, and yields a fine blue colour with the same properties as indigo, and was exported in the time of the Dutch.

The "heenoodoo peyelli" (*Desmodium triflorum*), is much valued by the natives as a cure for dysentery; *D. triquelum*, an Indian variety, is used in the peninsula for the same purpose.

The "nil kattarodoo" (*Clitoria ternata*), or the crow's bill, is a very beautiful twining plant with blue flowers found at Batticaloa. The white root is used by the natives as an emetic, and is also deemed medicinal in Tenasserim. *Soja Wightii* belongs to a genus of plants, natives of Japan, the Moluccas, and India; the seeds resemble haricot beans, and the Japanese sauce called soy is said to be made from them. *Glycine labialis* is a beautiful scandent named from the sweetness of its roots, and is allied to the liquorice plant. *Mucuna purita*, a variety of the stinging cow itch of Europe, has hairy pods, which are scraped and mixed with honey for expelling ascarides. In India the pods are called kirwach, and eaten when young by the natives. *M. gigantea*, found at Batticaloa, is remarkable for the immense size of its pods.

Arachis hypogæa, called the earth-nut, is a trailing plant introduced from Africa. The seeds yield a mild oil resembling olive, imported into England in large quantities from Africa, Ceylon, and America; the nuts are also eaten roasted. The "rata tora" (*Cajanus indicus*) is the "dhol bean" of India, with yellow flowers, and probably not indigenous.¹ The "olinda wel" (*Abrus precatorius*), a pretty climbing plant with yellow flowers, produces very hard bright scarlet seeds with a black spot at one end, and which are said to be poisonous. The roots contain a kind of sugar used as a substitute for liquorice, having a similar taste. It abounds in the cinnamon gardens. *A. pulchellus* is a variety with black seeds.

The "gam malloo" (*Pterocarpus marsupium*) yields a ruby-coloured gum which exudes from the bark, called kino, the "gummum rubrum astringens" of the old druggists, used in diarrhoea. There are several species of kino, but the only true

¹ Thwaites.

kind is obtained from this tree, also a native of Malabar, and a large size with numerous spreading branches, pale yellow flowers and a single seeded pod. The wood is hard and valuable. *P. santalinus* is also a large tree with a fine grained, hard and heavy, bright red wood, known in commerce as Sanders' wood, much used in dyeing, and largely exported from the island. The "gass kaala" (*Butea frondosa*) is a magnificent tree covered with a mass of orange-coloured blossoms, whose brilliancy is heightened by a jet-black calyx. It is also a native of the hills of India and Burmah, where it is named "lak." Dr. Hooker, in the Himalaya, found the branches covered with lac insects (i. 8). A red juice full of tannin, which flows from the bark, hardens into a brittle ruby-coloured gum, a species of kino.¹

The "errabadoo" (*Erythrina indica*) is called the coral tree by the Europeans, from its beautiful clusters of scarlet flowers resembling coral, found all over India and the Archipelago. The natives use it medicinally both for men and cattle, and eat the young leaves in curries.² The pretty models of canoes, well-known in the island, are made from the white soft wood, and it is also employed by the "mootchee" men of India for making toys.

The most charming tree in the island is the "deya rat mal" or asoka (*Jonesia Asoka* of Roxburgh), who named it in honour of Sir W. Jones; it is found in the interior near the sides of streams and damp places under the shade of larger trees. The flowers are a mixture of orange and crimson, producing long oval pods. The asoka is a great favourite with the Hindu poets, and Buddha is fabled to have been born under one; Dr. Roxburgh says, "the whole vegetable kingdom has not a more beautiful object."

Cæsalpinia.—This genus has usually yellow flowers, thorny barks, and wood possessing astringent and dyeing properties. Bakam is the Hindu and sappan the Malay name for the timber of the *Cæsalpinia Sappan*, a species of Brazil wood used for dyeing. There was formerly a large export of it from Ceylon and Malabar, the Dutch having nearly extirpated the

¹ Ainslie, p. 108.

² Thwaites.

trees to supply the demand. Sappan has lost much of its value since the discovery of South America, and the introduction of Brazil wood, which is of superior quality, now in its turn yielding to coal-tar dyes. The derivation of the word Brazil, first applied by Marco Polo, is not known, but the name was given to that part of South America, in consequence of the tree being found there by the early discoverers. Pigolotti called it colombino. (*Vide* ch. x. xii.) Extract of sappan contains gallic and tannic acid. The tree is lofty and slender, with a reddish thorny bark and fern-like leaves.

C. coriaria, a fine West Indian shrub which produces divi divi, used in tanning, has been successfully introduced into India, and might also grow in Ceylon. The "koombooroo" (*Guilandina bonduc*) is much used medicinally by the natives. It is also found in the West Indies, India, and Amboyna. The kernels are a very powerful tonic and febrifuge, known in India as bonduc-nuts, which turn blood-red with nitric acid.

Cassia.—There are many varieties of this genus, some furnishing the purgative leaves named senna by the druggists. Alexandrian senna is the leaflets of *C. acutifolia*. The flowers of all the Cassias are bright yellow. The "ahalla" (*C. fistula*) is very abundant, and every part of the plant used medicinally by the natives, while the centre of the tree furnishes good timber. They also use a decoction of the leaves of the "rana wara" (*C. auriculata*), found near the sea; the bark is employed in India for tanning. The "boo tora" (*C. absus*) with a hairy pod and black seeds, abundant in tall grass, is also a native of Northern India. The Hindus eat the leaves of the "ooroo tora" (*C. sophora*) in curries, and the Sinhalese those of two varieties they call "penni tora" (*C. occidentalis* and *C. Tora*), very common on the sides of roads.

Dialium ovoides, Thw., is a variety of the tamarind plum of India (*D. indicum*, Linn.) a large tree with white flowers, producing a brownish pod, having an agreeable acid taste.

Bauhinia.—Some of this genus are small trees or shrubs, others climbing-plants found in the tropics, stretching like huge cables from tree to tree, which they bind together in an inextricable maze. They are distinguished by two lobed leaves

and small white or yellow flowers, with a perfume of mignonette; the under bark is a natural rope of great strength, only requiring the outer cuticle to be scraped off.¹

The "myla gass" (*Piliostigma racemosa*, Thw.) abounds in warm jungles; the bark is made into ropes and the leaves are a favourite food of elephants. The "Maha-poos-wel," called jungle-rope by the Europeans (*Entada scandens*), belongs to the sub-genus *Mimosa*,² the most gigantic of climbing plants, producing pods three or four feet long, and six inches broad, containing beans two inches in diameter. They are very abundant about Pusilawa and damp jungles of the central province. Ropes are made from the bark, and the juice of the leaves is employed by the natives for stupefying fish. The seeds are used in India for making hair-wash, and as a febrifuge. The "madateya" (*Adenanthera pavonia*), very common near gardens, is called the red sandal-wood in India and grows to a great size, producing bright scarlet seeds with a circular streak in the centre, made into beads and ornaments. They are considered poisonous.

LYTHRACEÆ.—The "mooroota" (*Lagerstræmia regina*) is the most remarkable of this family in Ceylon, a very beautiful flowering tree with long pendent bunches of rose-coloured blossoms, producing winged seeds, which are deemed narcotic, and the bark and leaves purgative. *Lagerstræmia* grow in moist localities. *Lawsonia alba*, or the mock-privet, found at Manaar and Batticaloa by Dr. Gardner, is the henna of Egypt, the kupros of Dioscorides, and the Talmud (Cant. i. 12), used from the most remote antiquity in the East by women for staining their nails. Egyptian mummies are said to have been found so dyed. The leaves are pounded with catechu into a paste, producing a deep orange-colour. It is a shrub with exceedingly fragrant greenish-white flowers; a variety found in India named mahindee has thorns. *Griselinia tomentosa*, common in the Uva district, has scarlet flowers, sold in Indian bazaars under the name of doctoe, and are mixed with morinda dye.

¹ Royle, p. 296.

² Also called *E. puræstha* and *Mimosa scandens*.

COMBRETACEÆ form a purely tropical order, having very astringent fruit. The "pooloo gass" (*Terminalia Bellerica*) is a large deciduous tree found in open grassy places, producing the nuts called myrobalums, the size and shape of a nutmeg, covered with a grey silky down, and very astringent, much used in dyeing, tanning, and medicine, and are occasionally eaten, causing a slight intoxication. The flowers have an unpleasant smell, and a gum exudes from the bark, soluble in water, and burns in the flame of a candle. A variety named "araloo" (*T. Chebulu*), found in the same localities, produces the black myrobalums of commerce, smaller and more astringent than the others. Galls are found on them in India, which are much valued. *T. Catappa*, called the country almond by Europeans, is a large and very beautiful tree found in gardens; the nut, which resembles the Persian almond, has a rolled up kernel, very sweet and white, and yields a fixed oil. Most of the *Terminalia* attain great dimensions, the largest in Ceylon is the "kombook" (*T. glabra*), very numerous on the banks of rivers in the eastern province. They yield a juice which forms a varnish, and the timber resembles zebra wood.

MYRTACEÆ.—Many of this order, natives of warm and tropical climates, attain a great size, exemplified in the blue gum trees of Australia (*Eucalyptus*). Some large arborescent Myrtaceæ are found in the mountains. The myrtle, pomegranate, guava, clove, rose apple, and allspice (*E. acris*), a native of India, are of this order; all except the pomegranate possess a fragrant volatile oil, imparting to their fruit an agreeable odour.

Eugenia present many varieties in the island, usually with white flowers, producing a very small blackish berry resembling a sloe, none of which are eatable, being impregnated with a strong and bitter oil.

Syzygium.—Several of this tribe resemble the clove-tree, having aromatic and carminative berries. The "madang" (*S. caryophyllifolium*) has a round black berry the size of a pea, eaten by the natives; also those of the "dañ gass" (*S. caryophyllæum*). The "aloo bo" (*S. sylvestris*), found in the upper country, is a large tree with a purple fruit, called the

“jar plum” by the Europeans (*Calyptrates Jumbo* of Moon).

CUCURBITACEÆ.—This order comprises the many species of cucumbers, gourds, pumpkins, and melons growing in warm and tropical climates.

The “wal rassa kinda” (*Zanonia indica*), much valued by the natives as a febrifuge, is the climbing cucumber of India, slightly triangular in form, and the “yak komadoo” (*Citrullus colocynthis*), the colocynth of the drug shops. *Momordica charanta* is named the bitter gourd, “karawilla” of the natives, very common in their gardens, and used as vegetables along with some other species. In India they are eaten in curries and also salted. *Cucurbita lagenaria* is the bottle-shaped gourd, sometimes poisonous; there are several varieties large and small. The “vatta coloo,” or bird’s nest gourd (*Luffa acutangula*), very common in gardens, has ten sharp ridges, and is used in curries; when dried they have an odour of honey, and are full of fibres and round black seeds; a decoction of the fibres forms an emetic. The natives also eat the “neyang ratta cooloo” (*L. pentandra*), and in India the leaves are used as a vegetable. *L. amara* has black seeds and a bitter purgative fruit, used medicinally by the Hindus.

The genus *Trichosanthes*, Linn., are called snake-gourds from their sinuous shape, hanging from the trees over which they climb like writhing snakes; they are bitter and medicinal. The “dommallo” (*T. cucumerina*) is used by the natives as a febrifuge, and the “titta hondala” (*T. palmata*) is poisonous. *T. integrifolia*, Thw., is a wild variety, with a large spherical reddish fruit, having a black skin.

The genus *Bryonia* are all medicinal, the root of *B. epigæa* is very bitter and purgative, supposed formerly to be the kalamba root; varieties are found with small red pulped fruit. The “kakini” (*Cucumis pubescens*) is common on road sides, also the *Coccinea indica* in uncultivated places. The scarlet pulp is eaten in India, although it is deemed poisonous by some. Pumpkins (*Cucurbita pepo*) are a common vegetable in the lower country. The melon is said to have come from Persia.

PASSION WORTS.—These climbing plants are semi-tropical,

producing a melon-like fruit, as the Jamaica water melon; most of them are narcotic. The "hondala" (*Modecca palmata*) is considered poisonous, but the natives use it medicinally. "*Passiflora minima* and *P. foetida*, with an offensive odour in the flowers, found about cultivated grounds, are not considered indigenous."¹

CACTACEÆ.—*Rhipsalis Cassytha*, Gaertn., found on rocks and trees in the central province, is considered by Mr. Thwaites as certainly indigenous.² It is generally supposed that the whole of the cactus tribe are only native in tropical South America, all of them found growing in other countries having been introduced; the *Opuntia vulgaris*, common about Colombo, is the same as that growing on Mount Etna, both being exotic, and the *Cactus cochineus* on which the cochineal insect feeds, has been also introduced.

APIACEÆ.—This order is not numerous in the island, being mostly natives of cold and damp mountain regions. The "heen gotoocola" (*Hydrocotyle asiatica*) an herbaceous plant found in moist localities, is very abundant in all parts up to the highest elevations, the natives use it as an anthelmintic, and an infusion of the leaves is given to children in India as a febrifuge.

The "katamburu" (*Coriander sativum*) is a small, straight annual with reddish-white flowers, producing the well-known coriander seeds, the chief ingredient in curry powder. The plant is common in every part of Southern India, where the leaves are also used in curries.

Loranthus.—As in most tropical countries, there are many varieties and an abundance of these parasitical plants in all parts of the island, with bright red or orange blossoms covering the trunks of the trees with a mass of verdure. The "pililla" (*L. nilgherrensis*), an Indian variety, is found in the upper province. *L. cuneatus* is very destructive to fruit-trees, especially the orange, the *Loranthus* being a true parasite. *Viscum orientalis* is the Indian mistletoe.

¹ Thwaites.

² Flores albide calycis segmenta 4-5 apici rubro tincta, petala 5-6 oblonga albide, bacca ovalis albida sub translucens, semina oblonga nigra.—Flor. Zey. p. 129.

CAPRIFOLIACEÆ.—A species of *Lonicera* or honeysuckle (*Dichilanthe Zeylanica*, Thw.), has been found between Galle and Ratnapura. *Lonicera Leschenaulti* and the trumpet honeysuckle are common in the gardens of the Deccan, being probably introduced.

RUBIACEÆ.—The *Uncaria Gambier*, a valuable tree of the Archipelago, which furnishes the catechu of the chemists, was not supposed to be a native of Ceylon, but it has been lately found about Colombo. The *Mussenda frondosa*, named after the Singhalese “mussenda,” is a good-sized shrub, and one of the first plants that attracts the eye of a stranger, two or three of the leaves at the end of each branch being a pure white, contrasting remarkably with the green of the other leaves and the bright orange petals of the small flowers. The natives eat the leaves when they are boiled.

There are several varieties of *Ophiorhiza* with white flowers. The “lat katteya” (*O. mongoos*), a small and intensely bitter plant, has been named from an idea that the mongoos eat some of it as an antidote. (*Vide* ch. xxiv., xxvi.)

Heydotis.—These attractive plants with blue or purple flowers (white inside), present numerous varieties in all parts of the island, from the sea-shore to the highest elevations. The leaves of the “gatta cola” (*H. auricularia*), also those of *H. nitida*, are eaten by the natives with rice when boiled. The “kirri walla” (*Morinda umbellata*), is used for tying fences, and the bark and roots of the “ahoogass” (*M. bracteata*) are extensively used in India for dyeing red, mixed with chebula galls. In Ceylon they mix the leaves of the “cora cala” (*Memecylon umbellata*) and sappan wood with them.

The celebrated munjeet, or Indian madder (*Rubia cordifolia*), a native of Nepal, was supposed not to be indigenous in Ceylon, but it is found abundantly near Badulla; no use appears to be made of it in the island. Indian madder is almost identical with the European plant *R. tinctorum*, used as a dye and in medicine from the earliest times, being mentioned by Hippocrates; the dyeing property rests in the roots.

Two plants of the genus *Cinchonaceæ*, producing black berries allied to the true coffee, are found in Ceylon (*C. Travancorensis*

and *C. Wightiana*), but Mr. Thwaites says *C. Arabica* "cannot be considered indigenous, although many plants spring up in the jungles, carried by birds and monkeys." *Stylocoryne elliptica*, Thw., with a white corolla and red berries, was supposed to be a species of coffee.

The *Ixora coccinea* is one of the most beautiful of the flowering shrubs in the island, common in the cinnamon gardens and other moist, warm places; the small scarlet flowers grow in bunches. There are several varieties; *I. calycina* has a white corolla tinged with red, some have red berries. The *Parettia Indica*, a very ornamental shrub with white flowers, has been called the white ixora, also presenting many varieties, most of them being found in India and China. *Hyptianthera moringa* is the horse-radish tree of the Europeans.

CANNABACEÆ.—The seeds of *Cannabis Indica*, or hemp, are used in Ceylon for adulterating arrack and toddy, rendering them more intoxicating. The well-known Indian compounds called bhang and ganja are made from the leaves, and are said to produce a drowsy, ecstatic feeling and frenzy. The Arabians call them "cementers of friendship and increasers of pleasure." The most esteemed part of the plant is a gummy secretion which exudes from the stalk, having the properties of both wine and opium. Dr. Royle supposes it to be the "nepenthes" of Homer.¹ The intoxicating properties of hemp have been known from the earliest times, being mentioned by Herodotus (lib. iv. 74).

Indian hemp was long supposed to be distinct from the European species (*C. sativa*); there is, however, no difference, except that the deleterious properties of the plant are much more active in India and hot climates, where violent headaches and vertigo are produced from remaining too long in the plantations. Hemp is not indigenous in Ceylon, but is cultivated in the western maritime provinces and largely exported. The natives call it "mat kansha," which resembles the Arabian name. The following is a recipe for bhang: hemp leaves 3 drachms, black pepper 45 grains, cloves, nutmeg, and mace 11 grains each, triturated with 8 ounces of water or milk in a

¹ Plants of Cashmire, p. 334.

mortar. A long account of the effects it produces is given in the J. A. S. Beng., 1839, 735.

ASTERACEÆ.—The well known flowers of the chrysanthemum and dandelion are the usual type of the order. The “poo-pooloo” (*Vernonia anthelmintica*), or purple-flowered flea-bane of Linné, is found in native gardens, but not wild. *Conyza anthelmintica*, of India, is also called a flea-bane, the roasted leaves, it is said, banishing these insects. *Sonchus oleraceus*, or sow-thistle, is found about Galle, and is a common weed in the central province; it is eaten as a vegetable in the Nilgherries. The “wal kolondoo” (*Artemisia vulgaris*), a native of Europe, is found in gardens. *A. absinth* is the wormwood of the “Swiss liqueur,” they are intensely bitter. The “at addeya” (*Elephantopus scolar*), a small annual with pale red flowers on long hairy stalks, has leaves the shape of an elephant’s foot; it is used medicinally in India.

SAPOTACEÆ are a tropical order of plants abounding in milky juice or oily fluid, which, unlike the milky secretions of other orders, are generally harmless, and known in India as “butter trees” and “oil trees,” the African butter plant of Parke is one of them. The oil of the seeds of the “mee” (*Bassia longifolia*) is used by the natives for cutaneous diseases, and, when fresh, for cooking, and a medicinal oil much used in India is also obtained from the *Mimusops Indica*. The “lawooloo” (*Chrysophyllum acuminatum*) has a fruit resembling a crab eaten by the natives. The fruit of *Sapota elen-goides*, also a native of the Nilgherries, is used in curries in India. *C. acuminatum* is called the Indian star apple. There are many varieties of *Isonandria*, but the gutta-percha tree of the Archipelago (*I. gutta*) has not been discovered in the island or India. An oil resembling bassia, called “muria” by the natives, is extracted from the seeds of *I. grandis*, Thw., a large tree of the central province.

OLEACEÆ.—*Olea glandulifera* and *O. Gardneri* have some resemblance to the Spanish olive. The *O. fragrans* of China is used for scenting tea. Some varieties are natives of India. *Ligustrum robustum* is an evergreen shrub closely allied to the ash, having coloured berries and astringent leaves.

JASMINACEÆ.—The “pitcha” (*Jasminum sambac*) is abundant about Galle and Batticaloa. There are two varieties of sambac, one is a small shrub called the great Arabian jessamine, with large double blossoms, like small white roses, producing black berries; the other is a twining plant with single flowers. These are the most fragrant of the jessamines, from which oil of jessamine is extracted. *J. angustifolia*, a narrow-leaved twining plant, with large white flowers tinged with red, is also a native of the Coromandel. The “saipaala gass” (*Nyctanthes arbor tristis*), found about Jaffna in native gardens and near temples, but not thoroughly wild, is the *Arbor tristis*, or “sorrowful tree” of the old botanists, so named because it only blooms at night and soon after sheds its petals, which cover the ground in the morning; they have a delicious perfume resembling honey, but as evanescent as the flowers. The tube of the corolla is a fine yellow colour edged with white, used by the Buddhist priests to dye their robes, and also employed by the Mahometans in India, mixed with the flowers of the *Butea frondosa*, for dyeing their turbans. Its native country is said to be unknown, being only found in gardens in India. Linschoten describes the tree at Goa in 1589.

APOCYNACEÆ are chiefly tropical, and closely allied to Loganiades, many being very poisonous. *Willughbeia Ceylonicus*, a variety of *W. martabanica* of India, produces a large reddish fruit, a great favourite with monkeys. *Carissa caranda*, found at Jaffna, is a large thorny bush with very fragrant flowers, and blue-black berries the size of an olive, resembling damsons, but tasting like currants, the only fruit of the genus not poisonous, and much used in India as a jelly.¹

Alyxia Ceylonica, found about Ambogamma, is a variety of *A. stellata* of the Archipelago, the bark of which is now used in Germany for diarrhœa. The “gong kadooroo,” growing near the sea, is one of the *Cerbera* (*C. Odallam*); all of the *Cerbera* contain a milky fluid, which is stated to be purgative and poisonous. The kernels of the nuts of *C. Tanghin*, which grows in Madagascar, are a violent poison.

The “divi kadooroo” (*Tabernæmontana dichotoma*), a

¹ O'Shaugnessy, p. 444.

variety of the cow-tree of South America (so named from its containing a quantity of milky fluid), has a large fruit of a bright orange colour, with a reddish purple pulp full of seeds, used as a dye in India, where there are several varieties; the flowers are white, and only fragrant at night. Dr. Lindley says, "The sages of Ceylon suppose this to be the forbidden fruit, having the mark of Eve's teeth on it; before the events of Eden it was delicious, but since then it has become poisonous. This story appears to have originated with modern European writers, and not with the Singhalese; besides, it was the Mahometans who placed Eden in Ceylon, and there is no mention of this plant in their accounts of the island.

Wrightea antidysenterica furnishes the conessi bark of India, corti de palla of the Portuguese, formerly much esteemed as a cure for dysentery. *W. angustifolia*, found about Dambool, resembles *W. tinctoria* of India, a small tree, with soft pale green leaves, which give out a colour like indigo when bruised, the wood used in turning, resembles ivory. The "roo kattum" (*Alstonia scholaris*) has a light wood used by the natives for coffins. In the Concan, where the tree is abundant, it is bitter, and employed as a febrifuge. The "kirri walla" has also a pale close-grained wood, used for inlaying cabinet work, and a strong fibre called "dool" is obtained from the *Anodendron paniculatum*, Thw.

Several species of oleander are common in gardens about Colombo, all parts of these plants are poisonous, the roots of the *Nerium odorum*, or double oleander, being among the most violent of poisons. The golden-blossomed *Allamanda cathartica*, now naturalized in the island, is also poisonous, although it has been used medicinally.

• *Plumeria acutifolia*, a good sized shrub, found in gardens and near temples, is a native of South America, naturalized in several parts of India, a very singular plant, with a crooked trunk and straggling, almost leafless branches, swelling out at the ends, where there are a number of small orange flowers with a sweet fragrance; every part of it is full of a tenacious milky juice. •

ASCLEPIADACEÆ are a curious order of plants, some resem-

bling cactus, others have succulent leaves and stalks. The natives eat the young leaves of the "kang koombola" (*Cynoctonum pauciflorum*) and some other varieties in their curries, also those of the "kiri angoon" (*Hoya viridiflora*), and use the roots medicinally of the "eremoosoo" (*Hemidesmus Indica*), or Indian sarsaparilla, very abundant in the island, also in Bengal. It is a twining plant with rusty looking bark and small flowers, greenish outside and purple within.

Several other twining plants of this family have emetic and medicinal properties resembling ipecacuanha, as the Scamone emetica used in India as a substitute for it.

The "warra" (*Asclepia gigantea*) furnishes a very strong fibre, and contains a sweet milky juice, which hardens into a substance like gutta percha, used medicinally in Ceylon and India, and has been long known to the Arabians, who call it sukkur-al-ashur. A kind of manna is said to be found on the plant in India, where the fibres are employed in weaving; some handkerchiefs made from them were sent to the Paris Exhibition. A decoction of the roots of the "binnooga" (*Tylophora asthmatica*) is used by the natives for snake bites, and has been very successfully employed in India for dysentery. This is a twining plant with long white roots and orange flowers, also *Marsdenia tenacissima*, producing fibres. Dr. Roxburgh says, "the strongest of any plant except those of the *Urtica*," and used by the natives of the Rajmahl hills for their bow-strings. The stems are not steeped in water, but dried in the sun, when there exudes a quantity of milky juice, which hardens like India-rubber and removes lead marks.

Gymnema sylvestre and *G. lactiferum* (Wight's Icones), are half shrubby plants; the latter has leaves on short petioles, ovate, and unequal sided. Sir E. Tennent (i. 102) has remarked the mistake concerning one of these plants made in 'Lindley' (p. 625), and most botanical works, which say "*G. lactiferum* is the cow plant, 'kiri aghema' of the Sinhalese, who use the milk as food," some adding "that it was employed as vaccine matter," which is quite erroneous. According to Mr. Thwaites the *Hoya viridiflora* is the kiri angoon of the natives, and D'Alwis has noticed that Sir E. Tennent was

himself in error when he said "the Sinhalese did not eat the plant, but used it medicinally," the reverse being the case.¹

BIGNONIACEÆ are a tropical order of plants remarkable for their large and handsome trumpet-shaped flowers; they are mostly tall trees, but some are scandents. The "totilla" (*Calosanthes Indica*),² a tall straight tree, has large fleshy dark-red flowers, which produce immense fruit or capsules of an oval shape, about eighteen inches long and four or five broad. They are astringent as well as the bark, both being used in India for tanning and dyeing. The "deya danga" (*Spathodea Rheedii*)³ has large orange flowers, and the "lojmo madala" (*Stereospermum chelonoides*), an erect tree, with large fragrant dark crimson flowers, is found near temples, but not truly wild.

SESAMINE.—The "talla" (*S. indicum*), native about Jaffna, is much cultivated in the dry parts of the island for the sake of an oil extracted from the seeds called gingelee in India, where it is much used for cooking. This is the "sesamum" of Marco Polo, a small annual plant not unlike hemp, found all over the East. Sesame seeds are said to be exported from the eastern coast of Africa to Southern Europe, where the produce is sold as olive oil.

CONVOLVULACEÆ.—These climbing plants, which abound in tropical countries, are found all over the island, from the sea shore to the upper country, covering the sands of the coast and the trees of the jungles with their charming garlands of varied coloured blossoms, yellow, purple, blue, and white. Their roots contain an acrid juice, and some are medicinal. They have been divided by Choisy into numerous genera.

The "kirri baddoo" (*Batatas paniculata*) is very common about Colombo, and *B. edulis* in gardens; the latter has tuberous roots called sweet potatoes, eaten by both Europeans and natives, but are not very palatable, tasting like a frost-bitten potato, sweetish and soapy. *Pharbitis nil* Choisy is the least common in the island, the seeds are purgative, resembling jalap. The "alanga" (*Colonyction speciosum*), with white

¹ Sanskrit Catalogue, p. 19.

² Bignonia Indica.

³ Bignonia spathodia.

flowers, is very abundant. The natives eat in curries the pedicels of a small variety with purple flowers. *C. speciosum*, or a variety, is the "moon flower" of the Europeans (*Ipomœa bona nox*), so named from only blooming at night, its fragrant pure white petals shining in the moonlight. Roxburgh describes two species of *Bona nox* in India, one he calls the prince of convolvulus with large clove-scented white flowers, and *Ipomœa grandiflora*, the "munda valle" of Van Rhee de, which has a long tubular flower with little perfume, and grows twenty feet high.¹ *Ipomœa reptans* is found near tanks, and also cultivated as a vegetable.²

Ipomœa pes capra, "the goat's foot convolvulus," abounds near the sea, covering the sandy shores after the monsoons with a carpet of purple flowers. It also grows on the sands of the Coromandel coast. The "Vishnu kraanta" (*Evolvulus alsinoides*), likewise numerous on the shores, has a charming small blue flower, dedicated to Vishnu.

The "trasta walla" (*Ipomœa turpenthum*) has purgative roots, employed medicinally by the natives. Marco Polo calls it turbit, a product of Malabar, and the drug was much used in the "Middle Ages."

The "devi addaya" (*Ipomœa pes tigris*), or "tiger's foot" convolvulus, very abundant about Colombo, has bright yellow flowers. *I. reniformis* has also yellow flowers, the leaves are eaten as greens in India. *Shutteria bicolor* has half yellow and half buff flowers.

Roxburgh describes a scarlet *Ipomœa* a native of the Coromandel. The *I. coccinea*, growing about Colombo, is said to have come from the West Indies.

BORAGINACEÆ.—The "loloo" (*Cordia myxa*), produces a glutinous fruit with a heavy disagreeable odour, similar to the Sebesten fruit of old European Pharmacopœias. It is dried in India and used as a pectoral, possessing astringent properties. The tree is principally a native of Southern Europe, Persia, Arabia, and Egypt, and produces a soft wood easily ignited by friction. Egyptian mummy cases are said to be made from it.

¹ Flora Ind., i. 495.

² Thwaites.

SOLANACEÆ.—Many of this family are narcotic and poisonous, such as nightshade, thorn-apple, and tobacco, but some are edible, as the potato. The “kaloo kangwireya” (*Solanum nigrum*), or night-shade, is common in all parts of the island, it has white flowers and black berries. The Sinhalese eat the ripe fruit of the “malla battoo” (*S. ferox*), also those of a variety named “ella battoo,” and they use all parts of another variety, the “katto welbatto,” medicinally. The unripe fruits of the *S. indicum* are boiled and eaten.¹

Solanum esculentum, called the bringall by the Europeans, and the egg-plant in England, is cultivated as a vegetable much used both in Ceylon and India. The drop-shaped fruit has a deep purple shining skin enclosing a pulpy substance (*vide* ch. xix.).

Lycopersicum, or love-apples, commonly called the tomato, and several varieties of capsicum, or “chilies,” large and small, are cultivated in gardens.

The “mottoo” (*Physalis minima*) and *P. angulata*, called the country gooseberry in India, and the winter cherry in Europe, are common in cultivated places; the corolla is a dirty white and the calyx a reddish yellow, enclosing a small red fruit. The “amookkara” (*Withania somnifera*) has downy leaves and greenish yellow flowers with a red berry the size of a pea. They are all used medicinally by the natives, also in India, where the leaves are steeped in oil. *P. somnifera*, as its name implies, is very narcotic, and is mentioned by Dioscorides. Some of the berries have been found in Egyptian mummies. *Physalis Peruviana*, commonly called the Cape gooseberry, is quite naturalized at Newera Ellia, and makes good jam; the end attached to the leafy case requires to be cut off as it contains an acrid juice. *Datura fastuosa*, very common in cultivated places, is a variable species of the purple-blossomed *D. stramonium*, or thorn-apple of India, the flowers being sometimes quite white, resembling *D. Metel* of India, which has fragrant white flowers. These plants, very narcotic and dangerous, are used in India for all sorts of criminal purposes, the seeds being put occasionally into sweet-

¹ Thwaites.

meats. Laval and Linschoten both say the Portuguese women at Goa practised "the Indian trick of giving datura to their husbands, which sent them to sleep for twenty-four hours, in order that they might carry out their amours." The seeds smoked in a pipe have long been considered good for asthma.¹

SCROPHULARIACEÆ are another poisonous order of plants found in all parts of the world. The fox-glove (*Digitalis*), is the most common European variety. There are a great many species in Ceylon enumerated by Mr. Thwaites, of which little is known beyond their names. The leaves of the "gona kola" (*Pterostigma capitatum*, Thw.) are chewed by the natives with their betel, and the "loonoo-weela" (*Herpestis Monnieria*, Thw.), abundant in damp places, is used as a medicine for children.

Pedicularis, eaten by goats in Europe, is found at Newera Ellia.

ACANTHACEÆ.—This is quite a tropical order of plants, of little value, presenting a great number of varieties in all parts of the island, a few are used medicinally by the natives. Some are scandents, as the *Thunbergia coccinea* and *T. fragrans*. The latter has white flowers, and there are two varieties of *Ruellia*, one of this genus yields indigo in India.

Strobilanthes, called "nillo" by the natives, form part of the underwood around Newera Ellia and other high localities, presenting numerous varieties, with white, blue, purple, and red flowers, some being parti-coloured, red and white. They are chiefly septennial, brittle-jointed plants, like canes, from five to six feet high, growing in single stalks, forming in some places a dense underwood disagreeable to pass through. The flowers, which are full of honey and covered with bees, grow in clusters round the joints, and the seeds are a favourite food of jungle fowl and rats. As soon as they are shed the plants die and decay with great rapidity, being soon replaced by the young green crop. Elephants make great lanes in passing through the withered stalks.

LAMIACEÆ form a fragrant and aromatic order, such as mint and thyme. The "heen talla" (*Ocimum basilicum* and *O. canum*, Linn.) are very abundant about gardens, and closely

¹ Ainslie, Mat. Med., p. 444.

resemble each other; one is the common basil of Europe, used medicinally in India, where most of the basils are considered sacred plants and dedicated to Vishnu. The roots of *Ocimum sanctum* are made into highly polished beads, worn by his followers and by Brahmins; decoctions of the roots are given in fevers, and it is also used at funerals and thrown on graves and generally found growing near Hindu temples. The Singhalese, who call it "madooroo tallu," also use it medicinally. The woolly basil (*O. villosum*) is the "toolsee," on which Hindus are sworn.

Moschosma polystachyum is the common musk plant, and *Geniosporum elongatum* a variety of basil with a powerful odour, found among grass in the central province.

The "erec werey" (*Plectranthus Zeylanica*) is found in native gardens, and *Coleus tuberosus* and some other varieties are cultivated for their roots, which are eaten, or for cattle medicines, and the leaves of the "kolang kola" (*Pogostemon heyneanus*) are used medicinally. A plant closely allied to this, or one of the *plectranthus*, is supposed to be the source of patchouly, a perfume highly prized in India, which comes from Penang.

FLACOURTIACEÆ are chiefly thorny-stemmed trees or shrubs, found principally in the East and West Indies.

Bixa orellana grows about Kurnagalla and some other places, but is not considered indigenous; the capsules contain a number of seeds with a vermilion rind, and when it is separated by maceration in water forms the anotta of commerce, being annually imported into England, principally from the West Indies. A species of *Bixa* with white flowers is indigenous in India, but the anotta is inferior.

Phoberos.—There are several varieties of this very thorny tribe in Ceylon, producing small black berries, and their trunks are covered with clusters of formidable thorns. They were first described by Gærtner, and some difficulty has been experienced in identifying them from his descriptions. *Phoberos Gærtneri*, Thw., is his *Limonia pusilla*, but it is a large tree. The "katto kenda" of the natives (*P. acuminata*) is a medium-sized tree, with large spines.

PANGIACEÆ are a small order of poisonous plants found in India, closely allied to the papaya of the West Indies, which produces edible fruit.

The "makooloo" (*Hydnocarpus inebrians*), a large tree, grows on the banks of rivers in the lower country. The rusty-coloured tomentose fruit is used to intoxicate fish, who greedily devour it, and an oil made from the seeds is employed in skin-diseases, also from those of the "telli gass," (*Trichadenia Zeylanica*, Thw.) *H. inebrians* is also employed in Malabar to inebriate fish; the fruit, when eaten by man, is said to cause giddiness and dangerous symptoms.

PORTULACÆÆ.—The "heen gonda kola," *Portulaca oleracea* and *P. quadrifolia*, are common brilliant flowered plants with succulent leaves, used as spinach by the natives of Ceylon and India. *P. oleracea* is the purslane of the ancient Greeks, used as a pot herb and in salads.

TILIACEÆ or lindens generally contain a mucilaginous juice. *Corchorus olitorius* and *C. capsularis* are very common annuals, with small yellow flowers, producing flowers called jute in India, one of the materials from which gunny bags are made. They are said to be an article of food in Palestine and other parts of the East.

The "coaleya" (*Grewia orientalis*) is a large shrub producing a dark purple berry, used in India for making sherbet; the berry grows near the axilla of the leaf. The under bark of all the *Grewia* is very tough.

Elaeocarpus is exclusively an Indian genus producing edible fruit, resembling an olive, eaten by the natives of Ceylon and India.

E. obovatus and *E. montanus*, Thw., are medium-sized trees found at Newera Ellia and the higher central province, the berries being a favourite food of the large rock pigeons which frequent Newera Ellia.

DIPTERACEÆ.—This is a family of noble and gigantic trees, whose straight stems run up a great height before the branches which form the head are thrown out. They have very large oval leathery leaves and beautiful clusters of pink, yellow, or white flowers, forming a curious winged fruit, looking like two

long feathers stuck in a ball, and abound in oil or resinous juice of various qualities, some hardening into a kind of pitch called damma; used for covering the corks of bottles; others yield the gurjum oil of Indian bazaars. They have been long known, chiefly as natives of the Archipelago, Pegu, and parts of India, abounding at Chittagong, where, Dr. Hooker states, they attain a height of 200 feet (p. 332); but the existence of so many of them in Ceylon as enumerated by Mr. Thwaites, appears to be something new: he describes thirty-three varieties belonging to the genera of *Dipterocarpus*, *Doona*, *Shorea*, *Vatica*, *Hopea*, &c., all yielding oil or resin. Some of the Ceylon *Dipteraceæ* are described in Dr. Hooker's "Botanical Magazine" for 1854.

The "boo hora" (*Dipterocarpus hispidus*), found in the Saffregam district, is distinguished by large hispid leaves nineteen inches long and nine broad, with petioles two and a half long, calyx lobes six or seven inches long; and the "dirana gass" (*D. glandulosus*) is remarkable for the changing colour of the under side of the leaves, being pale yellow when young, red at maturity, and quite black when old.

The "doon" (*Doona Zeylanica*) yields a quantity of colourless resin, which exudes from the trunk and branches, and when dissolved in spirits of wine makes a fine varnish. The seeds of *Doona cordifolia* are roasted and eaten by the natives.

Shorea oblongifolia has fragrant yellow flowers, and appears to be closely allied to *Vatica Thunbergia* of India. *S. robusta* of India yields the dhoona resin used in Hindu temples; Buddha is said to have died under one.

The "hall gass" (*Vateria Indica*) yields great quantities of resin, used by the natives in their religious ceremonies. The resin is called copal in India, and anime gum in England. This is a gigantic tree, with oblong leaves from six to eighteen inches long, and panicles of white flowers, producing seeds four inches long. They are not winged.

GUTTIFERÆ.—These plants are chiefly remarkable for producing the yellow gum called gamboge; five species grow in the island; the "goraka" (*Garcenia gambogia*) is a tall tree,

producing a fruit something like a melon in shape, three inches in diameter, with a thin smooth yellowish rind, which is dried by the natives and eaten as a condiment with curries. The gum which exudes from the tree is semi-transparent and very adhesive, but insoluble in water. A variety produces a reddish-coloured fruit.

The "kana goraka" (*Hebradendron combogioides*) is the only species in the island from which true gamboge is obtainable, and as the tree is not uncommon the pigment may be collected in considerable quantities. It is said Ceylon gamboge is not known to commerce, although in many respects quite equal to the finest Siam, from whence most of this gum is brought.

Garcenia echinocarpa, Thw., is a species presenting four varieties, one with coriaceous leaves yields a thick oil, extracted from the seeds, used by the natives for burning in lamps, but gives a very indifferent light. It appears to be similar to the gamboge butter obtained in the Mysore jungles from *G. purpurea*, which the Hindus sometimes use as a substitute for ghee.

ERYTHROXYLACEÆ.—The "kerilla," *Sethia Indica*, yields an empyreumatic oil or wood-tar, used for preserving the timbers of native boats; an oil is obtained from the fruit in India, and the wood is so fragrant that it is used in Mysore as a substitute for sandal.

XANTHOXYLACEÆ.—The "kattoo keena" (*X. Rhetsa*) is a large tree, armed with sharp thorns, found about Colombo. The capsules have a strong aromatic taste, and the seeds are said to be used instead of pepper in India.

The "kudu merri wel" (*Toddalia aculeata*), very abundant in the lower jungles, is a formidable thorny plant, called the jungle nail by Europeans, being studded with knobs half an inch in diameter, from which project curved thorns as sharp as a lancet, rendering the jungles where it is abundant impassable. The bark is used as a febrifuge in India.

LAURACEÆ.—There are many varieties of *Tetranthera* called "kos badda," in the upper country, also several new species of *Actinodaphne*. The "oolooloo" found in the south-west is a

large timber tree, and two or three varieties of *Litsæa*, a kind of cassia, grow in the central jungles. *Vide* ch. xxxiii.

Sandal or some other fragrant wood, which cannot be identified, is several times mentioned in connection with the produce of Ceylon by Chinese writers, but is never found growing wild in the island now, being imported from Malabar, where it is abundant. The *Santalem album* is a small tree resembling myrtle. There are two species, one with white and the other with red wood. Sandal oil is made from the seeds, and the powdered wood used by native doctors for fevers.

Nepenthes.—The graceful pitcher plant (*N. distillatoria*) has often excited the curiosity of botanists, who have never been able to explain its use. Some have supposed the pitcher to distil water to supply the plant with moisture. The pitcher with its lid hangs pendent from a long stalk at the end of the leaf. They are very numerous in some parts of the island, and grow to a large size.

PISTIACEÆ.—The common duck-weed of Europe, *Lemna minor*, is not uncommon; it also grows in the Sikkim Himalayas. The tropical variety *Pistia stratiotes*, “deya parandella” of the natives, is found in the warmer parts of the island. This plant is common in the tanks of Jamaica, where it is said to poison the water.

TYPHACEÆ.—*Typha angustifolia*, and *T. elephantina*, two species of bulrushes, are found in the lower part of the island.

FERNS.—A numerous variety of ferns and club mosses abound in the damp jungles of the central province; many attaining a great size, as the tree fern (*Alsophila gigantea*), which is found at an elevation of 7000 feet in the Himalaya, but never so high in Ceylon.

* *Lycopodium clavatum*, the club moss of British moors, is found on the Horton plains.

Ophioglossum vulgatum, a variety of “adder’s tongue,” a kind of club moss, is common on the trunks of trees in the higher regions. It is named from a sort of shoot resembling the tongue of a snake, which projects from it. *Lycopodium scandens* is a climbing fern, common in the lower country, running over other plants.

No use appears to be made of any of them by the Sinhalese, but in India and other places some are eaten and others used medicinally. In the Nepal the tubers of *Aspidium* are eaten.

Botrychium virginicum, found at Newera Ellia on the ground under trees, is boiled and eaten in the Sikkim Himalaya; and the *Adiantum capillus veneris* or maiden hair, found in the Uva district, is said to be used in Europe for making syrup of capillaire.

APPENDIX.

THE MALDIVES.

THESE very remarkable isles are a dependency of Ceylon, but the authority over them is merely nominal, as they are governed by their own Sultan, who, however, acknowledges the sovereignty of Ceylon by sending every year a deputation with presents to the Governor soon after the setting in of the south-west monsoon, and in return is presented with a piece of scarlet cloth. *

Sir E. Tennent says " This custom has continued from time immemorial; and dates at least from the period of the Chinese supremacy in Ceylon, A.D. 1430, who claimed a sovereignty over the Maldives also," which seems very unlikely; it more probably dates from the time of the Portuguese, who erected a small fort on Madow, the principal atoll.¹

There is some trade between Ceylon and the Maldives, and their curious vessels are sometimes seen in the harbours. The seas round the islands swarm with fish, which is dried and sent to India, but their chief products are cocoa-nuts, coir, and cowries, mentioned by Arabian writers a thousand years ago, who divided them into two groups according to their produce, calling them *Diva-kouzah* (cowrie-isles) and *Diva-kanbar* (coir-isles.)²

¹ De Barros, dec. iii. l. ii. 305. l. iii. ch. i.

² M. Reinaud, in his *Frag. Arabes*, pp. 93, 124, gives a translation of part of an Arabic version of a Sanskrit history of India in the year of the Hegira 417, which says—"Ces îles se divisent en deux classes, suivant la nature de leur principal produit. Les unes sont nommées *Diva kouzah*, c'est-à-dire îles des cauris . . . les autres *Diva-Kanbar*, mot qui désigne le fil que l'on tresse avec les fibres du cocotier et avec lequel on coud les navires."—*Géographie d'Aboufêda*, Intro. *Frag. Arab.*, pp. 93, 124.

The cowries (*Cyprea moneta*) are caught in a peculiar manner. A number of threads are attached to bundles of cocoa-nut leaves like sheaves of wheat, which float on the sea; at the ends of the threads are little bits of meat which the shellfish swallow, and thus secured, they are then left in heaps to rot, and afterwards washed. Enormous quantities of them are obtained in this manner, several hundred tons being annually shipped to London for export to the coast of Africa. Some years since they were worth 20*l.* a ton, but are not so valuable since the decline in the African slave trade. Cowries have been used as small coin from time immemorial in the East. De Barros says they are much nicer than copper money.●

An account of the coral formations of the Maldives and their supposed gradual sinking beneath the ocean will be found in chapter IV. The number of little islands into which all the larger atolls are broken up is very great, being probably more than 1000. Atoll Madow, which is fifty-eight miles long and twenty-seven broad, contains one hundred, twenty-nine of which are inhabited, with from twenty to one hundred people in each; the largest isles are only about one mile each way, others only a few yards. The subsoil is a soft sandstone, which hardens on exposure to the air, and fresh water is obtained at a depth of six feet; it is remarkable that the quality of the water varies very much in wells within a few feet of each other, some being quite brackish and others fresh; the interior of the islands are usually several feet lower than on the outer edges.

The soil is said to be fertile, growing millet (*Panicum miliaceum*), vegetables, and roots, banyan trees, bread-fruit, tamarinds, and a few bamboos.

There are no wild animals except the flying fox, and only a few cattle brought from India. They abound in rats, and fowls, which are half wild, were so abundant some years since they could be bought for one penny each, and three dozen eggs for the same sum. There is only one snake to be found, which is said to be very venomous, but the name is not known.

The atolls are so little raised above the sea and so covered with cocoa-nut trees nothing else is to be seen until you are quite close to them, and are very unhealthy, particularly to strangers, who are subject to a dropsical complaint which swells the whole body, and disorders of the bowels. The temperature at night is 78° Fahr. and from 80° to 84° in the day.

The sea breaks on the outside of the atolls in a fearful manner, especially in bad weather, and were long the dread of mariners, many wrecks taking place, until they were surveyed and their position accurately defined by Captains Moresby and Horsfield in 1832.¹

There are said to be two races and languages in the islands, the dominant race being of Arab descent and speaking Arabic, but all the inhabitants are very strict Mahometans. If there is an aboriginal race inhabiting them, their origin does not appear to be known. The Rev. Dr. Wilson (J. R. A. S. vi., 43), supposes them to be descended from some Sinhalese wrecked there four or five hundred years since, but all the travellers say they have not the least resemblance to the Sinhalese or their language either.

Prinsep, in the "Journal of the Asiatic Society of Bengal" for 1836, gives a description of the Maldivian alphabet, which appears to be partly original, being composed of nine indigenous characters, with the addition of the nine Arabic numerals, distinguished by a comma over them.

The earliest notice of the islands being inhabited is in the time of the Emperor Julian, fifth century, and they appear to have been sometimes governed by women, which is mentioned by Abu-Zaid in the ninth century.

A very interesting account of these isles was given by Ibn Batuta, who lived there some years in the fourteenth century, and by Pirard De Laval, who was wrecked on them in 1601.

¹ Jour. Geog. Soc., vols. ii. v.

INDEX.

- ABHAYAGIRI**, Dagoba, 49
Abu Zaid, description of climbing-fish, 260
Acacias, 368
Acalepha, 274
Acanthurus, 247
Acciprites, 142
Acherontia, 217
Adam's Peak mentioned by Fa Hian, 9
 — Moses of Chorene, 9
 — when connected with Buddha, 9
 — called Salamala, 10
 — legends of, 11
 — Pawn Koo, 11
 — mentioned in the Samaritan Pentateuch, 12
 — route to the Peak, 17
 — The iron chains ascribed to Alexander, 20
 — Jacob Bryant's idea, 10
 — Fabricius, his "Codex," 12
 — Ied of the Gnostics not Adam, 13
 — Dulaurier's idea, 13
 — Sophia or Wisdom, 13
 — Noos and Logos, 14
 — first of the Æons, 14
 — Amitabha Buddha, 11
 — MS. of Valentinus, 13
 — Queen Candace's Eunuch, 15
 — ideas of the Portuguese, 15
 — Cornish legend, Hood's, 16
Adi Buddha, 76
Ægle marmelos, 368
Ælian, mention of tortoises, 202
 — export of elephants (vol. i., 190)
 — sword-fish, 246
 — walking-fish, 247
Æsop's fables, 29
Agamidae, 184
Albinism among the fauna, 101
Albyrouni on the pearl fishery, 239
Alexander and Adam's Peak, 10
Allobii, the, 71
Almeida Manoel and burying-fish, 255
Amitabha Buddha, 11
Ampullaria, 272
Anabis, The, 260
 — Daldorf's account, 261
Annelida, 236
Anonaceæ, 389
Anseres, 168
Ant-lion, 220
Ants, black, 223
 — red, 224
 — white, 211
 — their ubiquity, 223
Anuradhapura, ruins at, 52
Aphaniptera, 227
Apocynaceæ, 404
Araceæ, 386
Arachnida. See Spiders.
Arbor tristes, the, 404
Archelaus, and Buddha, 72
Architecture of the towns, 47
 — dagobas, 47
 — Indian topes, 50
 — monasteries, 51
 — the brazen palace, 51
 — palaces, 53
 — the Sat Mahal, 51
 — materials used in, 53
Arca-palm, 312
Aripo, description of, 292
Aristotle and burying-fish, 256
 — vitality of the turtle, 202
Arnatto, 411
Arrow-root, 384
Articulata, 230
Arts, weaving, 37
 — dyeing, 37
 — music, 38
 — painting, 38
 — carving, 39
 — gilding, 40
 — working in gold, 40

- Arts, pottery, 41
 — working in iron, 45
 — coins, 41
 — distillation, 43
 — carpenters, 43
 — mirrors, 44
 — glass, 44
 — *idem* conductors, 44
 Asclepiadaceæ, 405
 Ashref, the poet, 10
 Asoka trees, 395
 Asteraceæ, 403
 Atthakatha, the, 28
 Aurantiaceæ, 368
 Avicula, 285
 Avitchin, the, and peacock, 165
- BADGER, the Ceylon, 112
 Baker, Sir S., on Ceylon bears, 109
 — on elephants, 128
 — leopards, 114
 — description of Ceylon. (*Vide*
 vol. i. p. 88)
 Balsams, 379
 Bamboos, 387
 Bandicoot, the, 117
 Banyan trees, 382
 Baobabs, 367
 Barringtonia, 371
 Basil, holy, 411
 Batrachia, 200
 — list of, 206
 Bats, their numbers, 105
 — vivid colours, 105
 — their wings, 106
 — horse-shoe, 108
 — long-armed, 103
 — list of, 136
 Bears, 109
 Beckman, his commentary on Aristotle,
 255
 Bees, wild, 226
 Beetles, numbers of, 210
 — cocoa-nut, the, 210
 — golden, 212
 — water, 212
 — list of, 240
 Berycidæ, 243
 Bezoar, 46
- Bhang, 402
 Biche de Mer, 274
 Bignoniaceæ, 407
 Birds of Ceylon and India compared,
 139
 — eagles, sea and land, 142
 — hawks, 144
 — kites, 143
 — owls and night-jars, 144-147
 — the devil bird, 145
 — superstitions about it, 146
 — swallows, 148
 — kingfishers, 149
 — bee-eaters and hoopoes, 150
 — sun birds, 150
 — warblers and tailor birds, 151
 — wagtails and thrushes, 153
 — orioles and babblers, 154
 — bul-buls, 154
 — fly-catchers, 155
 — shrikes, 157
 — crows, jays, and starlings, 158
 — weaver birds, 159
 — their nest and fire-flies, 159
 — sparrows, 159
 — horn-bills, 160
 — parrots, 161
 — woodpeckers, 162
 — cuckoos, 162
 — pigeons, 163
 — peacocks, 164
 — jungle fowl, 165
 — partridge and quail, 166
 — sandpipers, 166
 — turnstones, 166
 — plovers, 166
 — herons, 166
 — storks and ibises, 167
 — woodcock and snipe, 168
 — screamers, 168
 — rail, 168
 — flamingoes, 168
 — darters and slugs, 169
 — grebe and teal, 169
 — shooting with buffaloes, 169
 — tern and gulls, 169
 — frigate birds, 169
 — list of birds, 171
 Birds' nests, when made, 140
 — edible, 149

- Blyth, Mr., of the Calcutta Museum, 97
 Boa, the Ceylon, 196
 Boar, the wild, 121
 Bolinas, the philosopher, 20
 Bo-tree, the, 382. (*Vide* also vol. i. 143)
 Books, Sinhalese, 24
 Boraginaceæ, 408
 Botany of Ceylon, 346
 — works on, 346
 — Burman's "Thesaurus," 346
 — botanical garden, the, 347
 — Thwaites's catalogue, 347
 — general aspect of the flora of Ceylon, 348
 — exotics, 350
 — list of vegetable products exported, 352
 Bowring, Sir H., fish of Siam, 258
 Brahminism, 78
 Brun, Le, account of crocodiles, 178
 — *idem* elephants, 122. (*Vide* also vol. i. p. 332)
 Bryant, Jacob, on Adam's Peak, 10
 — on Indian science, 30
 Buchanan, Ganges fish, 260
 — climbing fish, 261
 Buddha, his character, 56
 — doctrine, 57
 — death, date of, 62-63
 — biography of, 59
 — his Sutras, 28
 — Pitakas, The, 27-28
 — Pantajali Sutra, 71
 — The Four Truths, 64
 — patra, his, 85
 — attractive story of his life, 64
 — Saint Josaphat, 64
 — Saint Damascenus, 64
 — Greek authors on Buddha, 71
 — confounded with Manes, Wodin, Daniel, &c., 65
 — and the Manichees, 72
 Buddhaghosa, his Commentary, 28
 Buddhism, origin of, 66
 — and Brahminism, 66
 — expelled from India, 66
 — uncertain doctrines, 69
 — praying wheels, 68
 Buddhism, The Grand Lama, 68
 — resembles Christianity, 67
 — gymnosophists, 71
 — Fa Hian's account, 68. (*Vide* also vol. i. p. 231.)
 — eating of animals, 70
 — Stonehenge, a Boodh temple, 48
 — convocations, 26
 — priests, 88
 — nuns, 90
 — hell and heaven, 75
 — The Nirvana, 75
 — schisms, 77
 — relics, The tooth, 80
 — destroyed by the Portuguese, 81
 — The king of Pegu, 83
 Buffaloes, their dangerous temper, 132
 — love of mud, 132
 Buffon on the pearl fish, 284
 Bugs, flying, 228
 — aquatic, 227
 Bul-buls, 155
 Bullocks, used for draft, 134
 Bungarus, The, 195
 Burman's "Thesaurus," 346
 Burnouf on Buddhist documents, 23
 — *Histoire du Buddhisme* 56
 Butterflies, 215
 CACTUS, 400
 Calamander, 354
 Calamus palms, 313
 — aromaticus, 387
 Calophyllum (wood), 356
 Camels, attempt to naturalize them, 133
 Campanula, 375
 Cannabaceæ, 402
 Cape gooseberry, The, 409
 Caprifoliaceæ, 401
 Capsicum, 409
 Carabidae, 214
 Carangidae, 246
 Carawella, The, 194
 Cardamoms, 384
 Carnivora, 103
 — list of, 136
 Carpenters of Ceylon, 43
 Carrings, 39

- Cassia, 325
 Cassidide, 214
 Castor-oil tree, 352, 385
 Centipedes, 235
 Ceratophora, lizards, 185
 Cermatia, 235
 Cetacen, 134
 Ceylon moss exported, 352
 ——— oak, 358
 Chameleon, 186
 Champac, The, 390
 Chank shell, 270
 Chay root, 375
 Chaetodon, 224
 Cheiroptera, 105
 Chelonia, 202
 Childer's Fali Dictionary, 34
 Choultries, 1
 Christianity in Ceylon, 95
 Cicadide, 226
 Cinnamon of Ceylon not known to the
 ——— ancients, 330
 ——— when first mentioned, 334
 ——— origin of the term, 333
 ——— Sanskrit and Chinese names,
 ——— 333
 ——— doubtful if it was indigenous,
 ——— 334
 ——— various sources of bark, 336
 ——— not planted by the Dutch,
 ——— 337.
 ——— as a Government monopoly,
 ——— 338
 ——— Ceylon bark superior to all
 ——— other, 340
 ——— revenue derived from it, 341
 ——— quantity exported, 341
 ——— price of, 341
 ——— the plantations, 341
 ——— sold by government, 342
 ——— abolition of the monopoly,
 ——— 339
 ——— mode of preparing the bark,
 ——— 343
 ——— the chalias or peelers, 344
 ——— oil of cinnamon, 344
 ——— folia malabarthurum, 344
 ——— berries dried, 344
 Citronella oil, 368
 Clemens Alexandrinus, 71
 Clemens, account of Buddha, 71
 ——— the Brahmins, 71
 ——— Sarmanæ and allobii, 71
 Cleopatra, her pearls, 278
 Cloves, 351
 Chupeide, 249
 Cobra de capello, The, 189
 Cocculus indicus, 391
 Coco-nut. *See* Palms.
 Coffee, when first used as a beverage, 301
 ——— riots at Constantinople, 302
 ——— prohibited in England by Charles
 ——— II., 302
 ——— the first London coffee-shop,
 ——— 302
 ——— attempts of the Dutch to culti-
 ——— vate in Ceylon, 303
 ——— first English planters, 304
 ——— exports of, 304-308
 ——— tax on, 304
 ——— number of acres sold for plant-
 ——— ing, 304
 ——— Ceylon coffee mania, 305
 ——— present state of the trade, 308
 ——— the Suez canal, 308
 ——— number of Malabar coolies, 309.
 ——— number of acres planted, 311
 ——— infusion of the leaves, 311
 ——— borers and beetles, 211
 ——— bug, The, 229
 ——— tree rat, 117
 Coins, 41
 Coir. *See* Palms.
 Colombo wax, 344
 Convocations, Buddhist, 26
 Convolvulus, 407
 Coral tree, The, 395
 Cotton plant of commerce, 389. (*Vide*
 ——— also vol. i. p. 92.)
 Cowries, 418
 Crabs, 269
 Crocodiles, 178
 Crows, The, of Colombo, 158
 Crustacea, list of, 270-275
 ——— calling crabs, 269
 ——— hermit, 296
 ——— sand, 270
 ——— pea, 269
 ——— lobsters, 270
 ——— prawns, 270

- Cucumaria, 274
 Cucumbers, 399
 Cuckoos, 162.
 Cucurbitaceæ, 399
 Currency of Ceylon, 42
 Cycadaceæ, 371
 Cyprinidæ, 263
- DAGOBAS, the Ruanwella, 49
 ——— Rancot, 50
 ——— Abhayagiri, 49
 ——— Kalany, things found in it, 48
 ——— Jatawana, 49
- Dalada, The, 80
 Daldorf's account of climbing perch, 260
 Damascenus, Saint John, 64
 Dambool, The temple, 87.
 Damna resin, 413
 Datura, 409
 Deer, not found in dense jungles, 131
 — The musk, 131
 — barking and spotted, 131
 — paddy field, 131
 — albinos, 131
 — elk, their love for water, 131
- Del (timber), 354
 Demonology and snake worship, 91
 ——— kattadias, 93
 ——— devil priests, 93
 ——— devil dancers, 94
- Dendrophidia, 200
 Devil bird, The, 145
 — The Buddhist, 75
 Dhammapada, The, 23, 74
 Dilleniaceæ, 389
 Diptera, 227
 Dipteraceæ, 412
 Distillation, 43
 Dogs, pariah, 111
 — European, 111
 Dolphins, 135
 Doom palms, 316
 Dorotheus, Bishop of Tyre, 95
 Dragon flies, 220
 Duckweed, 415
 Dugong or mermaid, 134
 — fables about it, 134
 Durian, The, 392
 Dyeing, 37
- EAGLES, 144
 Earth nuts, 394
 Ebony, 355
 Egg plant, The, 409
 Elephants.
 ——— elephants, decrease in their numbers, 122
 ——— renown of Ceylon, 123
 ——— trade in them, 122
 ——— price of, 122
 ——— ivory, few have tusks, 123
 ——— origin of their name, 124
 ——— height of, 123
 ——— weight of male, 130
 ——— stomach peculiar in its form, 130
 ——— age of, Sinbad's romance, 124
 ——— agility of, 125
 ——— fond of cool places, 125
 ——— albinos, rare, 123
 ——— rogue, their propensities, 126
 ——— shooting, manner of, 127
 ——— as executioners, 128
 ——— kraals, 129
 ——— catching, by the Moors, 129
- Elk, The, 131
 Elu (language), 35
 Epiphanius and the Manichæes, 72
 Erythrina Indica, 395
 Erythroxylaceæ, 414
 Euphorbias, 384
 Exotics, 350
- FABACEÆ, 393
 Fabricius, his "Codex," 12
 Fa Hian, account of Buddha, 56, 68.
 (Vide also vol. i. 231.)
 Fauna of Ceylon and India compared, 98. (Vide also vol. i. ch. iii.)
 Fayrer, Dr., on snakes, 190
 Ferns, 415
 Fish of Ceylon, 242
 — Red Sea perch, 243
 — mullets, 244
 — chaetodon, 244
 — pterois (red fire fish), 245
 — scer fish, 245
 — bonito and albacore, 245

- Fish, dried fish (*kummelmus*), 245
 — sucking fish, 246
 — goat fish, 246
 — sword fish, 246
 — walking fish and lophotes, 247
 — sailor fish, 246
 — Cuvier's santeur, 247
 — sea surgeons, 247
 — unicorn fish, 248
 — lip fish, 248
 — parrot fish, 248
 — half beaks, 249
 — flying fish, 249
 — anchovies and sardines, 249
 — eels, 250
 — pipe fish and sea horses, 250
 — coffer fish and trigger fish, 250
 — balloon fish and urchin fish, 251
 — dog fish, 251
 — sharks and the pilot fish, 252
 — saw fish, 252
 — rays (gigantic) and sea devils, 252
 — poisonous fish, 253
 — fresh water fish, 254
 — travelling and burying, 254
 — not known to mediæval writers, 254
 — Beckman's Commentary on Aristotle, 255
 — migrate when tanks dry up, 256
 — Mr. Boake's experiments, 257
 — air breathers, 257
 — the lepidosiren, 259
 — mud fish, 258
 — dug up in various places, 259
 — the anabis, 260
 — mentioned by Abu Zaid, 261
 — Daldorf's account, 260
 — Captain Mitchell, 261
 — ophiocephalus, 261
 — gobies, 262
 — mastacembelus or aral, 262
 — chromedes, 262
 — fish found in hot springs, 264
 — sheat fish, 262
 — arius, a remarkable, 263
 — sucking carp, 263
 — barbels and roach, 264
 — dace and perch, 264
 — showers of fish, frogs, and snakes, 265
- Fish, Quatremere's account, 265
 — list of fish, 265
 Flacourtiaceæ, 411
 Flamingoes, 249
 Flying fish, 249
 Frogs, 200
 Fruits, native and exotic, 358
 — mangosteen, 358
 — papaw, The, 358
 — jambu, or rose apple, 359
 — loquat, 359
 — lovi lovi, 359
 — belimbi, 360
 — mangos, 360
 — mulberry, 360
 — litchi or nephelium, 359
 — shaddocks, 359
 — custard apples, 360
 — pomegranates, 360
 — guavas, 360
 Fruits, oranges, 360
 — cashew nut, 361
 — pine apples, 361
 — jak, The, described by Pliny, 362
 — banana or plantain, 362
 — avocada pear, 362
 — grapes and vitis Indica, 363
 Fungi, 367
- GALLINA, 164
 Gamboge (Ceylon), 414
 Gampola rest house and suspension bridge, 3
 Gautama Buddha, 60
 Geckoes, 182
 Gilding, 40
 Ginger, 384
 Glass manufactures, 44
 — conductors, 44
 Gloriosa superba, The, 371
 Glow-worms, 213
 Gogerly's, Rev., translations, 29
 Gold, working in, 39
 Golden beetles, 212
 Grallæ, 166
 Grape vine and wild varieties, 363
 — did it come from India, 363
 Grasses, 387

Greek writers on Buddha, 71
 Grimblot's translations, 33
 Gymnosophists, 71
 Guttiferae, 413

HALMILLIA (timber), 354

Hawks, 144

Hell and heaven, the Buddhist, 75

Hemp, 402

Hemiptera, 227

Henna, 397

Heydotis, 401

Hibiscus, 389

Holothuria or sea slug, 274

Homalopsidae, 199

Homoptera, 226

Honeysuckle, 401

Hood's Cornish legend, 16

Horn bills, 160

Horses, all imported, 119

—— strange manner of feeding, 120

Horses, from the Persian Gulf, 120

—— Pegu ponies, 119

—— from the Persian Gulf, 119

—— Australian, 119

Hydrophis, 198

Hydrophylax, The, 372

Hymenoptera, 223

ICHNEUMON or mongoos, 112

Ift of the Gnostics, 13

Iguana lizard, 180

Indian bael, 368

—— rubber tree, 381

Indigo plants, 393

Infusoria, 275

Insects, vast numbers of, 209

—— torment of tropical climates, 209

—— beetles, destructive, 210

—— cocoa-nut beetle, 210

—— coffee borers, 211

—— golden beetles, 212

—— burying beetles, 212

—— fire-flies and glow-worms, 213

—— tortoise beetles, 214

—— scavenger or copridæ, 214

—— butterflies, 215

—— moths and silk moths, 217

—— Tusseh moth, The, 217

Insects, stinging caterpillars, 217

—— split-wing moths, 218

—— oiketicus, 218

—— leaf-insects, 219

—— phasmide or stick insects, 219

—— cockroaches, 220

—— field-cricket and grasshoppers, 220

—— dragon-flies, 220

—— white ants, 221

—— black and red ants, 223-224

—— wasps and hornets, 225

—— honey bees and carpenter bees, 226

—— tree crickets, Ode of Anacreon, 226

—— flies, swarms of, 227

—— fleas, 227

—— mosquitos, 228

—— coffee bug, or lac insect, 229

—— ticks and mites, 230

—— chelifer, or book scorpion, 231

—— scorpions, 234

—— spiders, large grey, 231

—— the mygale, 232

—— tarantula, not the true, 232

—— bird-eating spiders, 233

—— epeira, 233

—— gasteracantha, 233

—— curious new spiders, 233

—— blind spiders, 234

—— four-eyed spiders, 234

—— spiders as food, 234

—— centipedes, 235

—— millepedes, 235

—— woodlice, 235

—— land leeches, 236

—— water leeches, 236

—— gigantic earth worms, 237

—— guinea worm, 238

—— list of insects, 239

Iron wood, 356

Iron, working in, 45

Ivy plants, 379

JACKALS, 110

Jagennátha, car of, described by Fa Hian, 66-77

Jak tree, the, 354-361

Jar plum, 399
 Jatakas, the, 29
 Jatawana, dagoba, 49
 Jelly fish, 274
 Jessamines, 404
 Jewa, the, of Malabar, 30
 Josaphat, Saint, 64
 Jungle nail, the, 414
 ——— rope creeper, 397

KADUGANNAVA pass, the, 3
 ——— obelisk to Capt. Dawson, 3
 Kandy, its situation, 8
 ——— infested with snakes, 8
 ——— the lake and temples, 8
 Kapila Vastu, 63
 Kattadias, 93
 Kekuna oil, 352, 385
 Kidney beans, 375
 King-fishers, 149
 Kino (gum), 394
 Kitto's Bible Cyclopædia, 12
 Koran, the, 14
 Kotmalec, vale of, 3
 Krishna, 32

LABRIDÆ, or lip-fish, 248
 Labrinthici, 260
 Lagerstrœmia, 397
 Lalita Vistara, the, 27
 Lama, the Grand, of Thibet, 68
 Languages of Ceylon, 34
 ——— Elu and Pali, 35
 ——— Tamil or Malabar, 34
 ——— of India, 36
 ——— Sanskrit and Gāthā, 36
 ——— Prakṛita and Panchālī, 36
 ——— Hindvī and Sauraseni, 36
 ——— Magadha and Drāvedi, 36
 Laurels, 414
 Leeches. *See* Insects.
 Lemon grass, and oil, 352, 388
 Lichens, 367
 Liliacæ, 387
 Literature, books, 24
 ——— manner of writing, 24
 ——— the Buddhist Scriptures, 26
 ——— when compiled, 26
 ——— the Lalita Vistara, 27
 ——— Milinda Pañha, 30

Literature, the Pitakas, 27
 ——— the Atthakatha, 27
 ——— Sanskrit and Pali MSS., 33
 ——— destroyed by Singha, 33
 ——— Childer's Pali Dictionary, 34
 ——— Clough's Sinhalese Dictionary, 34

Lizards. *See* Reptiles.

Lobelias, 375
 Lobsters, 270
 Loris, the, 104
 Loganiacæ, 392
 Lote berries, 385
 Lotophagi, 364
 Lotus, the, 364
 Lythracæ, 397

MACACUS (monkey), 102
 Madder, Indian, 401
 Magnoliacæ, 390
 Malcolm, Lieut., and Adam's Peak, 17
 Maldives, the, a dependency of Ceylon, 417
 ——— when dated from, 417
 ——— called Cowrie and Coir Isles by the Arabs, 417
 ——— manner of catching cowries, 418
 ——— number of atolls, 418
 ——— soil and produce, 418
 ——— wild animals, 418
 ——— the aborigines, 419
 ——— language, 419
 Malvacæ, 388
 Mammalia of Ceylon and India, 97
 ——— question of the elephants, 99
 ——— monkeys only two genera, 102
 ——— presbytes, or wanderoos, 102
 ——— the rilawa, 104
 ——— loris or sloth, 104
 ——— bats, numbers of, 105
 ——— horse-shoe, 108
 ——— long armed, 108
 ——— painted, 108
 ——— carnivorous and vampire, 108
 ——— very small species, 108
 ——— flying foxes, 107

Mammalia, bears, their savage nature, 109
 ——— list of wild animals killed, 110
 ——— panthers, or leopards, 114
 ——— the black variety, 114
 ——— palm cats, 111
 ——— tiger and other wild cats, 112-115
 ——— jackals, 110
 ——— mongoos, 112
 ——— encounters with snakes, 113
 ——— do they eat antidotes, 113
 ——— squirrels, 115
 ——— pariah dogs, 111
 ——— rats, black and Norway, 117
 ——— lament of Waterton, 117
 ——— bandicoot, or pig rat, 117
 ——— field rats, 118
 ——— tree rats, 118
 ——— kangaroo, or jumping, 118
 ——— rats as food, 118
 ——— porcupines, 118
 ——— mode of catching them, 119
 ——— hares, 118
 ——— ant-eaters, or manis, 121
 ——— horses, 119
 ——— buffaloes and bullocks, 133
 ——— wild pigs and boars, 121
 ——— deer, the musk, 131
 ——— Muntjac, or barking, 131
 ——— paddy, field and spotted, 131
 ——— elk, fond of water, 131
 ——— mermaid, or dugong, 134
 ——— whales, 135
 ——— porpoises and dolphins, 135
 ——— list of mammalia, 136
Mangroves, 369
Manichees, the, 72
Manis, or ant-eater, 65
Mantidæ, 219
Mara (Buddhist devil), 75
Marco Polo and the pearl fishery, 280
Margoza oil, 369
Maya, mother of Buddha, 60
Medicine, 45
Mee timber and oil, 354
Meliaceæ, 369
Menispermads, 390
Metempsychosis, 57-73

Mihintala, hill of, 88
Millepedes, 235
Milinda Pañha, 30
 ——— Raja of Lahore, 30
Mirrors, 44
Mistletoe, 400
Mollusca, 269
Monasteries, 51
Mongoos, the, 113
Monitors, 180
Monkeys, 102
Mosquitoes, 228
Muir, Dr., on Indian languages, 28
Müller, Max, on Buddhist Scriptures, 28
 ——— on Nirvana, 74
Mullidæ, or mullets, 244
Murænidæ, or eels, 250
Music and musical instruments, 38
Mustard tree of Scripture, 367
Myriapodæ, 234
Myrobalams, 398
Myrtaceæ, 398
NAGA SENA, 30
Necrophagæ, 212
Necroscia, 219
Neuroptera, 220
Newera Ellia, the climate, 4
 ——— when discovered, 4
 ——— its home reminiscences, 6
Nillo jungle and the plant, 7, 410
Nirvana, various opinions on, 73
Noos and Logos, 14
Nuna, Buddhist, 90
Nutmegs, wild and exotic, 351, 390
Nux vomica, 392
Nymphaea lilies, 363
OLEACEÆ, 403
Oleander, 405
Ophiocephaliæ, 261
Ophiorhiza, 401
Orchids, 36
Orthoptera, 219
PACHYDERMATA, 121
Pañces, 53
Pali language, 34
Palma, the, 312
 ——— areca, 312

- Palms, thorny, 313
 ——— calamus, or ratans, 313
 ——— date, 313
 ——— talipat, 314
 ——— palmyra, 315
 ——— remark of Rumphius, 317
 ——— timber, 313
 ——— palmyra fruit, 316
 ——— the doom palm, 316
 ——— sugar of, 118
 ——— the cocoa-nut palm, 320
 ——— varied products of, 320
 — vast number of nuts, 321
 ——— oil, and export of, 322
 ——— oil cake and copra, 322
 ——— coir, and export of, 323
 ——— toddy and its adulteration, 324
 ——— cocoa-nut gathering, 325
 ——— export of nuts, 326
 ——— cocoa-nut sugar, 325
 ——— the maldivé, or double nut, 327
 ——— cocoa-nut planting, 328
 ——— cocoa-nut beetle, 328
 Palmyra (palm), 315
 Pandanaceæ, 370
 Pangiacæ, 412
 Pantajali sutra, the, 71
 Panthers, 114
 Pariah dogs, 111
 Parroquets, 161
 Pawn koo, 11
 Peacocks, 164
 Pearls, highly prized in the East, 277
 — Cleopatra's exploit, 278
 — modern pearl drinking, 278
 — English pearls, 279
 — origin of the term *Margarita*, 280
 — revenue from the fishery, 282
 — natural history of the fish, 283
 — Reaumur on pearls, 283
 — the foot of pearl fish, 286
 — migrations of the fish, 288
 — artificial pearls, 290
 — description of the fishery, 292
 — shark charmers, 293
 — manner of diving, 295
 — drilling and polishing, 299
 Pediculati, 247
 Pedru-talla-galla, 8
- Pelicans, 170
 Persian lilac, 369
 Perch, Red Sea, 243
 Percidæ, 243
 Phoberos, 411
 Physalis, 274
 Pigeons, 163
 Piperaceæ, 383
 Pistis Sophia, the, 13
 Pitakas, the, 27
 Pitcher plant, the, 415
 Planaria, 273
 Plants of the shores, 369
 — of the north, 367
 — of the hills, 374
 Plectognathi, 250
 Polanarrua, 52
 Pomacentridæ, 248
 Porcupines, 118
 Portuguese man-of-war, 274
 Pottery, 41
 Praying wheels, 68
 Presbytes, 102
 Priests, Buddhist, 88
 Primroses, 379
 Pristinidæ, 252
 Pteropus, or Roussets, 107
 Purslane, 412
 Pusilawa, road to, 3
- QUADRU MANA, 102
- RADIATA, 273
 Rajida or rays, 252
 Ranunculus, 375
 Raspberries, wild, 378
 Ratans, 313
 Rats. *See* Mammalia.
 — snakes, 196
 Reptiles of Ceylon, 178
 — crocodiles, river and marsh, 178
 — not dangerous out of water, 178
 — vitality of crocodiles, 180
 — iguanas or monitors, 180
 — the *hydrosaurus*, 181
 — poison made from them, 181
 — dried lizards used in medicine, 181

Reptiles, scines and acontias, 182
 ——— geckoes, 182
 ——— calotes or bloodsuckers, 184
 ——— sitana and salia, 184
 ——— lyro-headed lizards, 184
 ——— horned lizards, 185
 ——— chameleon, the, 186
 ——— cophotis and otocryptis, 185
 ——— snakes, their fangs and teeth, 186
 ——— snakes all carnivorous, 186
 ——— snake charmers, 188
 ——— the cobra, 189
 ——— legends about cobras, 188
 ——— snake bites and antidotes, 190
 ——— Drs. Fayer and Davy's experiments, 193
 ——— snake stones, 192
 ——— the tic polonga, 193
 ——— the carawallas, 194
 ——— snake-eating snakes, 196
 ——— python or boa, 196
 ——— rat snakes, 197
 ——— shield, blind, and ground snakes, 197
 ——— sea, and fresh-water snakes, 199
 ——— tree snakes, 199
 ——— frogs and toads, 200
 ——— tree frogs, 201
 ——— burrowing batrachia, 201
 ——— turtles and tortoises, 202
 ——— vitality of the turtle, 202
 ——— gigantic fossil turtles, 203
 ——— hawk's bill, cruelty to, 203
 ——— terrapins, 203
 ——— list of reptiles, 204
 Rest houses, 1
 Rhamnaceæ, 385
 Rododendrons, 376
 Rice, 388 (*Vide* also vol. i., 90)
 Rilawa, the, 104
 Rodentia, 115
 Rubiaceæ, 401
 SACK-TREE, the, 381
 Saint Thomas, the Apostle, 95
 ——— Hilaire, B., on Buddha, 35-56
 ——— Josaphat and Buddha, 64
 ——— Damascenus, 64

Sakya or Buddha, 60
 Saman, Râma's brother, 11
 Samanta Kuta, a name of Adam's Peak, 11
 Sandal-wood, 415
 Sanders-wood, 395
 Sanskrit MSS., 33
 Sapotaceæ, 403
 Sappan-wood, 395
 Sarmanæ, Buddhist, 71
 Satin-wood, 356
 Scienide, 245
 Scombresocidæ, 249
 Scombride, 245
 Scyllide, 251
 Schurmann, Anna Maria von, 234
 Schwartz's "Pistis Sophia," 13
 Scines, 182
 Scorpions, 230
 Screw pines, 370
 Scrophulariaceæ, 410
 Sea snakes, 196
 Sedges or cyperaceæ, 365
 Senna, 396
 Sesame oil, 407
 Shalmanesar and the Jews, 30
 Sharks and pilot-fish, 251
 ——— charmers and pearl divers, 293
 Shells, land and sea, 270
 ——— clanks, 270
 ——— window shells, or placuna placenta, 271
 ——— oysters, 271
 ——— janthina, 272
 ——— nudibranchiata, 272
 ——— teredo, 272
 ——— land shells, 273
 ——— list of shells, 276
 Shrews, or musk rats, 108
 Siluride, 262
 Snake stones, 195
 Snakes. *See* Reptiles.
 Solanaceæ, 409
 Sophia of the Gnostics, 13
 Sorcery and witchcraft, 94
 Sorrowful tree, the, 404
 Spiders. *See* Insecta.
 Squamipinnes, 224
 Squirrels, 115
 Sterculiaceæ, 391

- Stonehenge, 48
 Strobilanthes, 410
 Sun-birds, 150
 Sunrise in the tropics, 2
 Swallows, 148
 Sword-fish, 246
 Syngnathidæ, 250

 TALIPAT PALM, 314
 Tamarinds, 358
 ——— plumb, 396
 Tarantula, 232
 Teak, 357
 Terebintaceæ, 385
 Termites, 221
 Thwaites, his Catalogue of Plants, 347
 Tic-polonga, the, 196
 Ticks, 230
 Tiliaceæ, or lindens, 412
 Timber trees, export of, 353
 ——— the del, 354
 ——— jack, 354
 ——— mee, 354
 ——— halmillia, 355
 ——— calamander, 355
 ——— ebony, 355
 ——— satin-wood, 356
 ——— iron-wood, 356
 ——— tulip tree and teak, 357
 ——— tamarind and Ceylon oak, 358
 ——— tobacco, exports of, 253. (*Vide*
 also ch. iv.)
 Toads, 200
 Toolsee, 411
 Topes, Indian, 50
 Travelling, mode of, 1
 ——— fish, 254
 Tree snakes, 199
 ——— frogs, 201
 Trapa water-plant 365
 Tree ferns, 415
 Trepang, or Biche de Mer, 274
 Triglidae, 244
 Tulip trees, 357

 Turtles, 200

 UPAS TREE, the, 382
 Uropeltida, 197
 Urtica or nettles, 381
 Uruwella, forest of, 61

 VACCINUM, 376
 Valentinus, the Gnostic, 13
 Vegetable productions, list of, 352
 Viharas or temples, 86
 ——— description of, 86
 ——— at Dambool, 87
 ——— rock cut, 87
 ——— *idem* of India, 87
 Viverra, 111

 WAGTAILS, 153
 Walker, Colonel, 17
 Wanderoos (monkeys), 103
 Wasps, 225
 Water cocoa-nut, 370
 Water plants, 363
 ——— lotus or water-lily, 363
 ——— an article of diet, 364
 ——— sacred among Hindus and
 Buddhists, 364
 ——— bladder-worts, 365
 ——— sedges, 365
 ——— trapa, 366
 Whales, 135
 Willehald, the traveller, 16
 Woodpeckers, 162
 Worms. *See* Insects.

 XANTHOXYLACEÆ, 414
 Xiphiidæ, 246

 YAMS, 386
 Yasodara, Buddha's wife, 61
 Yons or yonicas, 30

 ZINGEBBERACEÆ, 384
 Zoophytes, 274

THE END.

